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Numerical and phytosociological classification of the vegetation of the Bozburun Peninsula (Southwestern Anatolia)

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Key words: classification, Mediterranean vegetation, Muğla, numerical analysis, phytosociology, syntaxonomy

Ključne besede: klasifikacija, sredozemska vegetacija, Muğla, numerična analiza, fitosociologija, sintaksonomija

Abstract

Vegetation patterns of the Bozburun Peninsula (southwestern Anatolia) were investigated using numerical phytosociological methods to classify plant communities and evaluate their relationships with environmental factors. A total of 168 vegetation plots were sampled using the Braun–Blanquet approach. Cluster analysis, Multiple Response Permutation Procedure (MRPP), Indicator Species Analysis (IndVal), and Bray–Curtis polar ordination were applied. Three major vegetation units were identified: phrygana, maquis, and *Pinus brutia* forests. Ordination analyses showed that elevation and precipitation are the main environmental gradients controlling vegetation distribution. Phrygana occupies lower and drier habitats, maquis occurs under intermediate conditions, whereas *Pinus brutia* forests are associated with higher and relatively wetter sites. The study also describes three new syntaxa and demonstrates that numerical phytosociological methods provide an effective framework for vegetation classification and syntaxonomical interpretation in southwestern Anatolia.

Izvleček

Na polotoku Bozburun (jugozahodna Anatolija) smo z numeričnimi fitocenološkimi metodami raziskali vegetacijske vzorce, s katerimi smo klasificirali rastlinske združbe in ovrednotili njihovo povezavo z okoljskimi spremenljivkami. Z Braun-Blanquetovo metodo smo popisali 168 vegetacijskih ploskev in za analize uporabili klastrsko analizo, permutacijski postopek za večkratne odgovore (MRPP), analizo indikatorskih vrst (IndVal) in Bray–Curtisovo polarno ordinacijo. Ugotovili smo tri glavne vegetacijske enote: frigano, makijo in gozdove z vrsto *Pinus brutia*. Ordinacijska analiza je pokazala, da sta glavni okoljski spremenljivki, ki vplivata na razporeditev vegetacije, nadmorska višina in padavine. Frigana uspeva na nižje ležečih in sušnih rastiščih, makija se pojavlja na vmesnih razmerah, gozdove s *Pinus brutia* pa povezujemo z višje ležečimi in relativno vlažnimi rastišči. V članku smo opisali tudi tri nove sintaksone in pokazali, da numerične fitocenološke metode omogočajo uspešen pristop klasifikacije vegetacije in sintaksonomsko uvrstitev v jugozahodni Anatoliji.

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Introduction

Anatolia exhibits exceptionally rich plant diversity due to its geographical position, geological structure, diverse landforms, and its inclusion of the Mediterranean, Irano-Turanian, and Euro-Siberian phytogeographical regions. According to Davis (1965–1982), additional factors contributing to this richness include Anatolia's role as a biogeographical bridge between Asia and Europe, its function as a center of diversification for many genera and sections, and its status as a center of origin for numerous cultivated plants. For these reasons, Anatolia has attracted considerable interest, initially from foreign researchers and, since the 1960s, increasingly from Turkish scientists, leading to numerous studies of its flora and vegetation.

Vegetation studies in Türkiye began in the eighteenth century with the explorations of Tournefort and were subsequently advanced by several European botanists working in different regions of Anatolia (Handel-Mazzetti, 1909; Schwarz, 1935–1936; Czeczott, 1938–1939; Krause, 1940). Later, important contributions by Turkish botanists, particularly Hikmet Birand and subsequent researchers, substantially improved the understanding of the country's vegetation structure and phytosociology (Birand, 1960; Çırpıcı, 1987).

Türkiye is characterized by vegetation dynamics shaped by diverse climatic conditions and anthropogenic factors. In addition, its biogeographical position has made the country home to three of the 34 global biodiversity hotspots identified worldwide: the Caucasus, the Mediterranean, and the Irano-Turanian regions (Myers et al., 2000). These characteristics make Türkiye one of the most important regions for floristic and vegetation studies in the Mediterranean Basin.

Globally, biodiversity is under serious threat. Access to data repositories facilitates the assessment of biodiversity on a global scale and provides crucial support for decision-makers and conservationists in developing protection strategies, monitoring vegetation changes, and identifying and mitigating existing threats (Sabatini et al., 2021). These goals, however, can only be achieved through local-scale floristic and vegetation studies.

In recent years, quantitative analysis techniques have become increasingly important in phytosociological studies. In particular, multivariate analysis methods such as ordination and clustering provide a more objective representation of the structure of plant communities and their relationships with environmental factors. Classical descriptive approaches often fail to adequately reflect these relationships; in contrast, quantitative methods allow for the statistical evaluation of environmental variables. Today, these methods are widely used in phytosociological studies and significantly enhance the interpretative power in the literature. Accordingly, numerous vegetation studies employing such approaches have been reported in recent years in Türkiye (Kavgacı et al., 2017; Kurt & Negiz 2018; Karaköse, 2019; Özdeniz, 2019; Bonari et al., 2021; Karaköse & Terzioğlu 2021; Kavgacı et al., 2021; Kaytanlıoğlu et al., 2023; Negiz & Erfidan 2024; Aytepe & Kavgacı 2025; Malkoçoğlu & Kara, 2025; Malkoçoğlu et al., 2025; Aytepe, 2026).

The aim of this study is to classify and characterize the plant communities of the Bozburun Peninsula using numerical phytosociological methods and to evaluate their relationships with environmental variables through clustering and ordination analyses. In addition, the study aims to contribute to syntaxonomical knowledge of Mediterranean vegetation by identifying diagnostic species and describing the floristic and ecological structure of the vegetation units.

Materials and Methods

Materials

The Bozburun Peninsula, which constitutes the study area, is located within the boundaries of Marmaris district, Muğla Province, in the southern part of Türkiye, at 36°41' N and 28°04' E, and lies within the Mediterranean phytogeographical region.

The Bozburun Peninsula has a predominantly mountainous topography and contains numerous bays of varying sizes. It is characterized by a highly indented coastline and includes many mountains and hills exceeding 500 m a.s.l. in elevation. The main mountains and hills of the peninsula include Palamut hill (879 m a.s.l.), Eren Mt. (842 m a.s.l.), Gökdağ (594 m a.s.l.), Güvenç Mt. (746 m a.s.l.), and Güver Mt. (718 m a.s.l.). The highest point in the area is Palamut Hill, at 879 m a.s.l. (Eken et al., 2006). The peninsula supports *Pinus brutia* forest communities between İçmeler–Hisarönü and Bayır, maquis communities between Bayır and Söğüt, and phrygana (garrigue) communities in other parts. In addition, the coastal sections, particularly in the southern parts of the peninsula, consist of limestone rocky areas that are largely devoid of vegetation (Figure 1).

The major soil groups of the study area were mapped using the "Muğla Province Land Assets Map", published by the General Directorate of Rural Services of the Prime Ministry. Accordingly, the main soil groups in the study area include colluvial soils, red-brown Mediterranean soils, non-calcareous brown forest soils, red Mediterranean soils, bare rock, and scree (Anonymous, 1998).

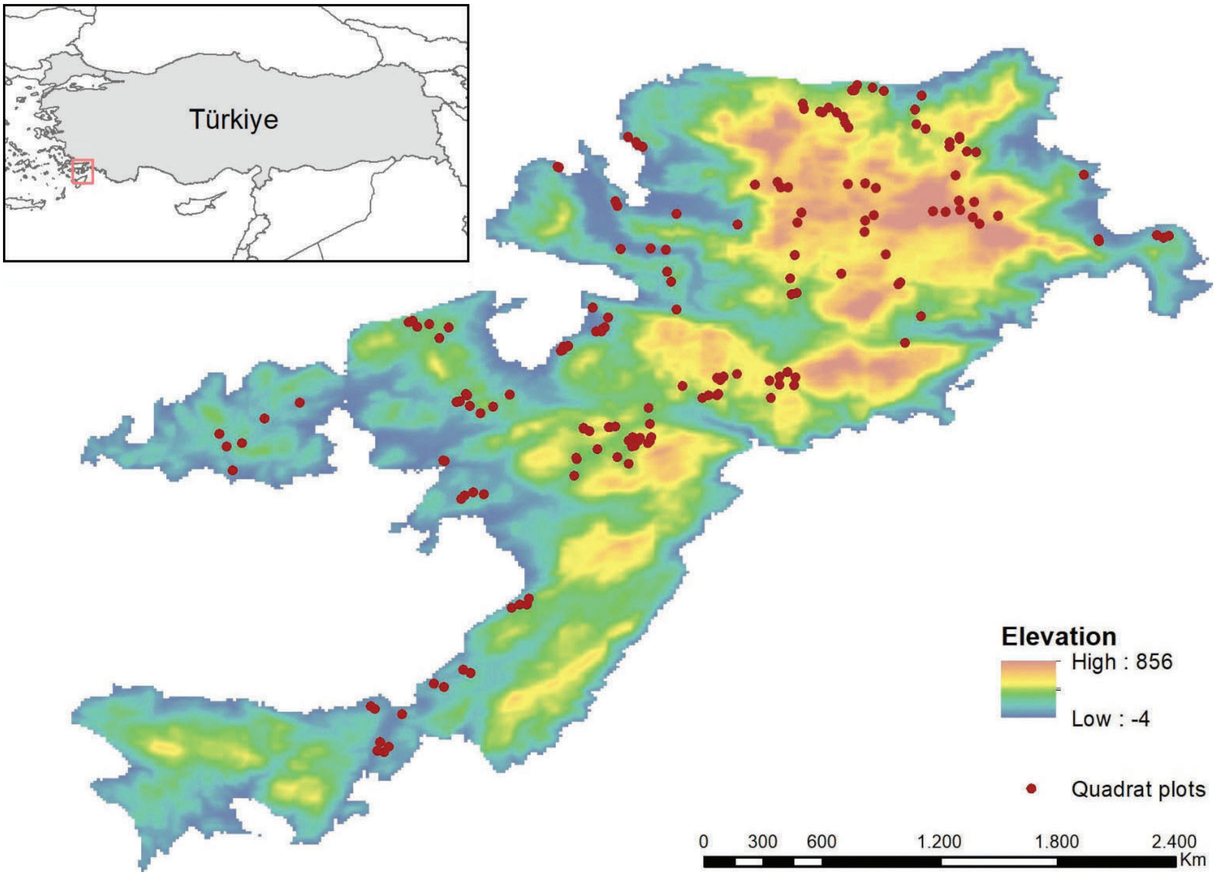


Figure 1: Geographic map of the Bozburun Peninsula with indicated locations of sampling plots.
Slika 1: Zemljevid polotoka Bozburun z označenimi lokacijami vzorčnih ploskev.

The geological structure of the study area is mainly dominated by bedrock units composed of limestone and dolomite blocks (Şenel & Bilgin, 1997). Although the presence of peridotite bedrock is observed in a very limited area at the western end of the peninsula, no sampling plots could be established there due to the absence of suitable vegetation cover. The geological map of the area was prepared based on the sheets produced by the General Directorate of Mineral Research and Exploration (MTA) (Figure 2) (MTA, 2026).

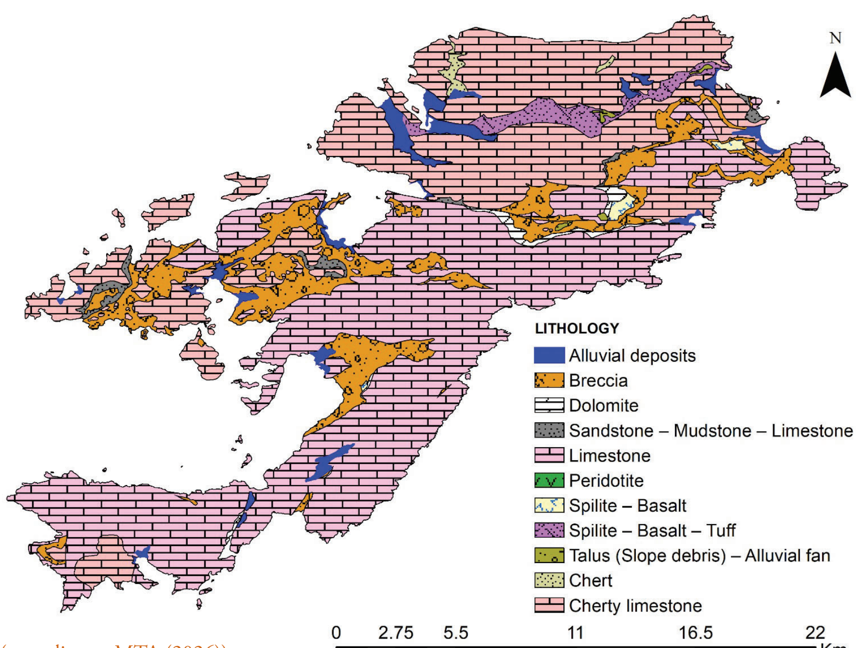


Figure 2: Geological map of the study area (according to MTA (2026)).
Slika 2: Geološka karta preučevanega območja (v skladu z MTA (2026)).

To describe the climatic characteristics of the study area, long-term data from the Marmaris Meteorological Station were used. The total annual precipitation in the study area is 1258 mm. The wettest month is December, with 288 mm of precipitation, while the driest month is August, with 7 mm. The mean annual temperature at the Marmaris station is 18.7 °C. The highest mean monthly temperature is observed in July (28.2 °C), whereas the lowest mean monthly temperature is recorded in January (10.6 °C) (Meteorology General Directorate, 2014).

Methods

Sampling plots were conducted between 2013 and 2015 during the peak flowering period (April–June). The sampling plot sizes were set at 900 m² for forest formations, 256 m² for maquis formations, and 100 m² for phrygana (garrigue) formations, and a total of 168 vegetation sampling plots were established. These sampling plot sizes were selected according to the minimum-area concept commonly used in Braun-Blanquet phytosociological studies (Braun-Blanquet, 1932; Akman, 2011). In addition, preliminary field sampling begun with smaller vegetation sampling plots and was progressively expanded until the floristic composition of each vegetation type was adequately represented. The selected sampling plot sizes were found to be optimal for reflecting the structural and floristic characteristics of the forest, maquis, and phrygana vegetation units in the study area.

For each sampling plot, topographic characteristics including elevation, slope, and aspect and vegetation attributes such as total vegetation cover and the cover of individual layers were recorded. The heights of the tree, shrub, and herb layers were measured in the field. Species composition was documented by listing all vascular plants, and abundance–cover values were determined according to the Braun-Blanquet (1932) phytosociological method and abundance–cover scale (r: solitary individuals with negligible cover; +: few individuals with cover <1%; 1: numerous individuals with 1–5% cover; 2: 5–25%; 3: 25–50%; 4: 50–75%; 5: 75–100%), following Akman (2011).

The cover and height of the tree, shrub, and herb layers were recorded separately in the field as structural characteristics of each sampling plot. Species composition, however, was recorded using the standard Braun–Blanquet relevé method, in which all vascular plant species were documented within a single relevé irrespective of vegetation layer. Accordingly, all numerical analyses were based on the complete species composition of each sampling plot.

All environmental factors used in the analyses were coded and abbreviated prior to statistical procedures. Temperature and precipitation variables were derived from meteorological observation data obtained from the Turkish State Meteorological Service for the Marmaris region and its surroundings. Considering both data continuity and proximity to the study area, the Marmaris meteorological station was used. Since no meteorological station directly represented the vegetation sampling plots within the study area, station-based climatic data were spatially interpolated in ArcMap using the Inverse Distance Weighted (IDW) interpolation method. IDW is one of the commonly used interpolation approaches for transforming point-based climatic observations into continuous surface data and has previously been applied in ArcMap for estimating long-term precipitation and temperature patterns in Türkiye (Yenipınar et al., 2021; Yılmaz et al., 2023). Separate raster surfaces were generated for temperature and precipitation variables, and the corresponding values for each vegetation sampling plot were subsequently extracted from these raster datasets and used as environmental variables in the ordination analyses.

A total of 470 plant taxa were identified in the study area. However, only taxa with a frequency greater than 10% were included in the ordination analyses, reducing the dataset to 182 taxa. Subsequently, a binary species-by-sampling plot matrix was constructed, with sampling plots arranged in rows and taxa in columns. The exclusion of rare or low-frequency species prior to multivariate analyses is a commonly applied data preprocessing approach in vegetation and ecological community studies (McCune & Grace, 2002). Previous studies have reported the use of different frequency thresholds for excluding rare or low-contribution taxa in vegetation classification studies, and the 10% threshold applied in the present study was considered appropriate within this framework (Addicott et al., 2018). The influence of rare species on vegetation analysis results has also been discussed as an important methodological factor in recent ecological studies (Gillet et al., 2025). The Indicator Species Analysis (ISA) results of the recorded taxa (Observed IV, Mean IV, S.Dev., and p-values) are provided separately for the forest, maquis, and garrigue units in Appendix 1, Appendix 2, and Appendix 3, respectively.

To evaluate the robustness of the different clustering solutions, a Multiple Response Permutation Procedure (MRPP) was performed. The corresponding T, A, and P values are presented in Table 1.

Table 1: MRPP Analysis Results: T, A, and P-values.
Tabela 1: Rezultati MRPP analize: vrednosti T, A in P.

Group Discrimination	T	A	P
Sorflex2	-70.195816	0.09478620	0.00000000
Sorflex3	-72.197374	0.13828544	0.00000000
Sorflex4	-66.194035	0.15890897	0.00000000
Sorflex5	-54.067841	0.16657697	0.00000000
Exwrd2	-60.080851	0.08109822	0.00000000
Exwrd3	-67.632300	0.12968591	0.00000000
Exwrd4	-68.148785	0.16033104	0.00000000
Exwrd5	-65.754322	0.17977464	0.00000000

In the first stage of the statistical evaluation, a presence–absence data matrix was constructed for the plant taxa recorded during the inventory studies according to the Braun-Blanquet method, to be used in cluster analysis (Fontaine et al., 2007; Özkan, 2009; Malkoçoğlu & Kara, 2025). Previous studies have demonstrated that Braun-Blanquet data can be analyzed using different transformation approaches and that presence–absence transformation is appropriate for vegetation classification and ordination analyses (van der Maarel, 1979). For the derivation of vegetation groups, the Sørensen–Flexible Beta and Euclidean–Ward clustering methods were tested. To determine the most appropriate separation for the clustering analysis, a Multiple Response Permutation Procedure (MRPP) was applied. The Sørensen–Flexible Beta method was preferred because it produced vegetation groups that were more consistent with floristic composition, ecological gradients, and field observations compared with the Euclidean–Ward method. In the MRPP analysis, the T statistic (test statistic), A value (chance-corrected within-group agreement), and P value (significance level) were compared to determine the optimal group separation.

The dendrogram obtained from the cluster analysis was cut at 2, 3, 4, and 5 group levels, and the cut levels were applied following the procedure proposed by Özkan (2009). To identify the indicator species of the cluster groups, Indicator Species Analysis (ISA, IndVal) was performed using PC-ORD version 6.0 (McCune & Mefford, 2011). Polar Ordination (PO) was used to evaluate the relationships between species composition and environmental factors. Finally, Bray–Curtis Polar Ordination (PO) was applied to determine the relationships between plant community distribution and environmental variables.

Data analyses were conducted using the PC-ORD software package (McCune & Mefford, 2011). PC-ORD was used for multivariate analyses, particularly for Indicator Species Analysis (ISA) to identify diagnostic species of the vegetation groups, as well as for ordination procedures. Relationships between environmental variables and the main ordination axes were evaluated using Pearson correlation coefficients (r).

Diagnostic and constant species were evaluated using the Indicator Species Analysis (ISA) output parameters (Observed IV, Mean IV, S.Dev., and associated p-values) generated in PC-ORD. These numerical parameters were interpreted together with field observations and the ecological characteristics of the vegetation units.

Constant species were primarily identified as taxa occurring in at least 40% of the sampling plots within the relevant vegetation unit, supported by field observations and ecological consistency. Dominant species were identified according to their Braun–Blanquet cover-abundance values together with their physiognomic importance within each vegetation unit; therefore, no fixed cover threshold was applied.

Plant nomenclature follows Plants of the World Online (POWO, 2026). The syntaxonomic nomenclature and evaluation of the identified vegetation units were performed in accordance with the International Code of Phytosociological Nomenclature (ICPN) (Theurillat et al., 2021), while the higher syntaxonomic framework follows Bonari et al. (2021).

Results

The study area is located within the Mediterranean phytogeographical region and includes the characteristic vegetation types of the Mediterranean climate. Forest, maquis, and garrigue vegetation types are well represented within the study area. Considerable degradation is evident on the Bozburun Peninsula due to tourism pressure, fires, agricultural land conversion, and grazing.

Classification

A total of 169 sampling plots were surveyed in the study area. Of these, 70 plots were taken from *Pinus brutia* forest vegetation, 50 plots from maquis vegetation, and 49 plots from garrigue vegetation. During the field inventory stage, a total of 470 plant taxa were recorded. It was determined that 288 taxa had frequency values below 10% within the dataset. Therefore, these taxa were excluded from the vegetation data matrix due to their low representation. Statistical analyses were conducted using 168 sampling plots and 182 plant taxa, as one sampling plot was excluded due to insufficient species representation after the frequency filtering process.

Cluster analysis applied to the vegetation data matrix using two different distance measures (Sorensen–Flexible Beta and Euclidean–Ward's) produced vegetation groupings at 2-, 3-, 4-, and 5-group cutting levels. Based on the results of cluster analysis and Indicator Species Analysis (IndVal), the main vegetation units of the study area and their indicator species were identified.

Different cutting levels (2-, 3-, 4-, and 5-group solutions) were evaluated for both Sørensen–Flexible Beta and Euclidean–Ward's clustering methods. Among these alternatives, the 3-group solution obtained using the Sørensen–Flexible Beta method provided the most ecologically meaningful classification, clearly separating garrigue, maquis, and forest vegetation units. This solution was further supported by MRPP results and Indicator Species Analysis and was therefore selected for subsequent ecological interpretation.

To identify the most appropriate classification among the eight different group solutions, the Multiple Response Permutation Procedure (MRPP) was applied. The MRPP results are presented in Table 1. In MRPP, T values indicate the degree of separation between groups, whereas A values reflect within-group homogeneity. Accordingly, the most suitable classification is expected to have the lowest T value and the highest A value. Across the evaluated cutting levels, T values ranged from −54.06 to −72.19, while A values ranged from 0.081 to 0.179.

Based on the MRPP results, the T and A values of the different group solutions were evaluated using tables and figures. The clustering analysis performed with the Sorensen–Flexible Beta method showed the most suitable results for the 3-group solution and was considered more appropriate for representing the vegetation structure of the study area. In the 2-group solution, the sampling plots were primarily separated into shrub-dominated vegetation units (maquis and garrigue/phrygana) and pine forest vegetation. In the selected 3-group solution, the sampling plots were clearly differentiated into garrigue/phrygana vegetation (Group 1), maquis vegetation (Group 2), and pine forest vegetation (Group 3). Therefore, the 3-group differentiation obtained by the Sorensen–Flexible Beta clustering was selected for the vegetation classification stage, and ecological interpretations were made accordingly (Figure 3). In contrast, the Euclidean–Ward's method resulted in considerable overlap among forest, maquis, and garrigue sampling plots, leading to less ecologically interpretable groupings.

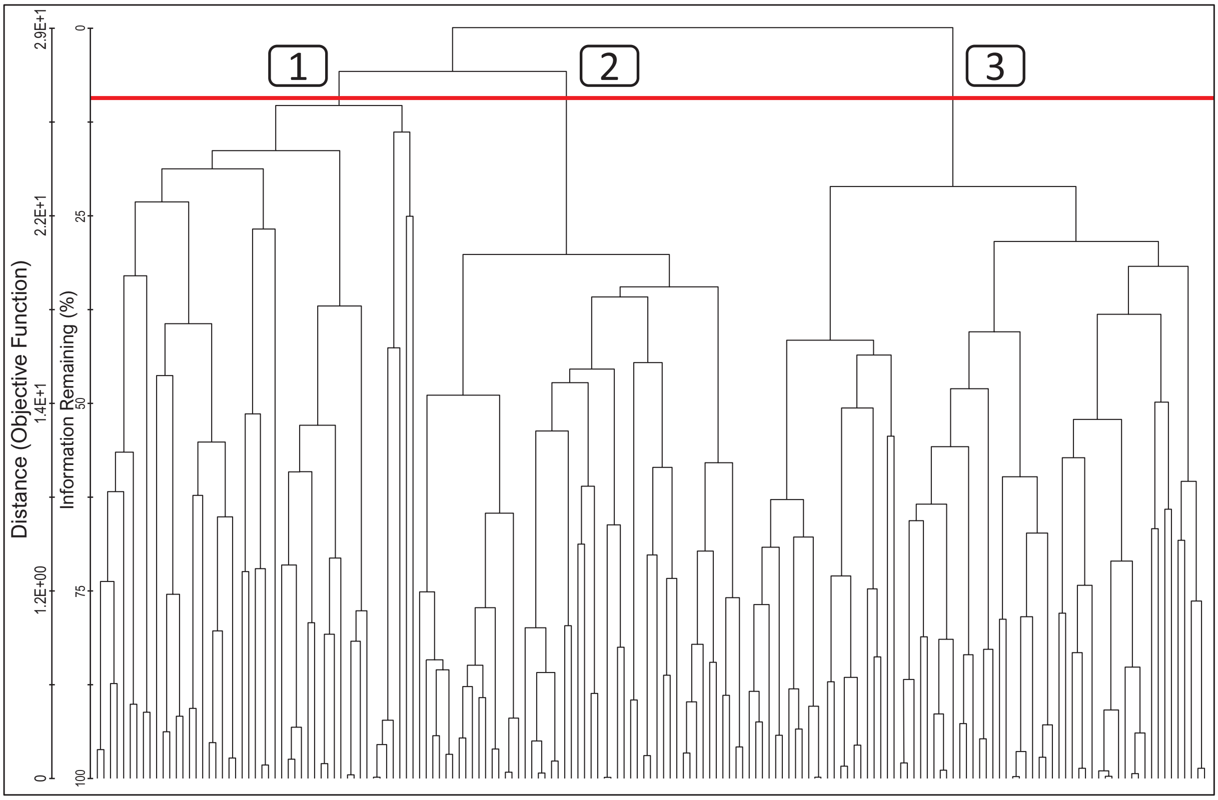


Figure 3: Group differentiation of clustering analysis according to the Sorensen-Flexible Beta method (Group 1: 48 sample plots, Group 2: 50 sample plots, Group 3: 70 sample plots).

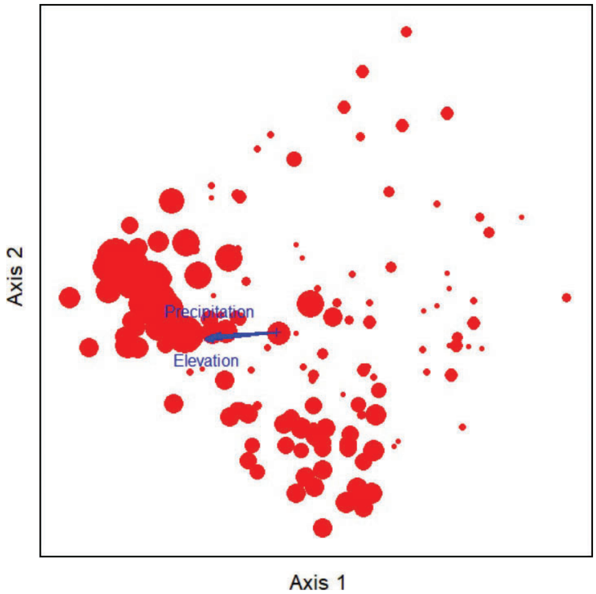
Slika 3: Rezultat klastrske analize z metodo Sorensen-Flexible Beta (skupina 1: 48 vzorčnih ploskev, skupina 2: 50 vzorčnih ploskev, skupina 3: 70 vzorčnih ploskev).

The vegetation classification was based on the results of the Sørensen–Flexible Beta clustering analysis and supported by the MRPP and Indicator Species Analysis (IndVal) results. Sampling plots were not manually reassigned to different vegetation groups during the classification process. Although a limited number of sampling plots showed partial overlap among vegetation types, no sampling plots were manually reassigned after the cluster analysis. Instead, these overlaps were interpreted ecologically based on field observations. Field observations conducted throughout the study area indicated that such overlaps were mainly related to vegetation degradation and human-induced degradation processes affecting the community structure.

Following the exclusion of one sampling plot after the frequency filtering procedure, Bray–Curtis analysis was performed using the remaining 168 sampling plots. Three ordination axes were extracted. The first two axes together explained 28.64% of the total variance (Table 2) and were therefore considered sufficient for ecological interpretation. The distribution of the 168 sampling plots along Axis 1 and Axis 2 is presented in Figure 4.

Table 2: Percentage of variance explained by the Bray–Curtis ordination axes.
Tabela 2: Odstotek pojasnjene variance Bray–Curtis ordinacijskih osi.

Components	Variance (%)	Cumulative Variance (%)
1	17.50	17.50
2	11.14	28.64
3	7.44	36.09



Correlation coefficients of environmental variables with the ordination axes are given in Table 3. Only variables with an absolute correlation coefficient of |r| ≥ 0.200 were displayed as vectors in the ordination diagram (Figure 4). Although the first two ordination axes explained a limited proportion of the total variance, the Axis 1–3 configuration provided a clearer ecological separation of the main vegetation groups, particularly in relation to elevation and precipitation gradients. In contrast, the Axis 1–2 ordination showed a greater overlap among vegetation units. Therefore, the Axis 1–3 relationship was considered more informative for ecological interpretation. Elevation and precipitation showed strong negative correlations with Axis 1, whereas mean temperature showed a positive correlation with this axis. The remaining variables exhibited weak correlations and were therefore omitted from the diagram.

Table 3: Correlations of environmental variables with Bray–Curtis axes.
Tabela 3: Korelacija med okoljskimi spremenljivkami in ordinacijskimi osmi Bray–Curtis analize.

Variable	Axis 1 (r / r^2)	Axis 2 (r / r^2)	Axis 3 (r / r^2)
Elevation	-0.509	-0.107	0.500
Aspect	-0.047	-0.033	0.026
Slope	-0.106	0.005	-0.051
Precipitation	-0.536	-0.163	0.497
Mean Temperature	0.210	0.164	-0.138

Elevation and precipitation displayed the strongest relationships with the ordination pattern, particularly along Axis 1 and Axis 3. The negative correlations of elevation ($r = -0.509$) and precipitation ($r = -0.536$) with Axis 1 indicate that the main gradient in species composition is associated with topographic and climatic variation, separating lower, drier sites from higher, wetter ones. Similarly, Axis 3 showed positive correlations with elevation ($r = 0.500$) and precipitation ($r = 0.497$), suggesting that this axis represents an additional component of the same environmental gradient, possibly related to microhabitat differentiation or vegetation structure. Mean temperature exhibited weaker but still interpretable correlations, whereas aspect and slope showed consistently low correla-

Figure 4: Distribution of sampling plots along Axes 1 and 2 based on Bray–Curtis ordination. Environmental arrows represent variables with correlation coefficients of |r| ≥ 0.20 with the ordination axes. Symbol size reflects the relative abundance-cover values derived from the Braun–Blanquet data matrix, with larger symbols indicating higher abundance-cover values and smaller symbols indicating lower abundance-cover values.

Slika 4: Razporeditev vzorčnih ploskev vzdolž Bray–Curtis ordinacijskih osi 1 in 2. Puščice predstavljajo okoljske spremenljivke s korelacijskim koeficientom |r| ≥ 0.20 z ordinacijskimi osmi. Velikost simbolov predstavlja relativno velikost abundance in pokrovnosti po Braun-Blanquetu, kjer veliki simboli predstavljajo večje vrednosti, manjši pa manjše.

tion values across all axes, indicating their limited influence on species composition at the scale of the study area.

Examination of species positions along the ordination axes and their correlation values revealed clear differentiation in vegetation structure. Species such as *Pinus brutia* (–0.796), *Aristolochia guichardii* (–0.524), *Asparagus aphyllus* subsp. *orientalis* (–0.541), and *Crepis fraasi* (–0.576) were located on the left side of Axis 1, corresponding to lower elevations and relatively drier conditions. In contrast, *Sarcopoterium spinosum* (0.581), *Crepis commutata* (0.585), and *Valantia hispida* (0.574) were positioned on the right side of this axis and were associated with different moisture and light conditions.

Along Axis 2, *Andropogon distachyos* (0.409) showed a right side position, indicating an association with certain topographic variables, whereas *Clematis cirrhosa* (–0.554), *Allium subhirsutum* (–0.469), and *Anagyris foetida* (–0.442) were located at the left end.

Along Axis 3, *Pinus brutia* (0.542), *Aristolochia guichardii* (0.488), and *Crepis fraasi* (0.475) were positioned in the right direction, suggesting a relationship with increasing elevation and precipitation regimes, while *Sarcopoterium spinosum* (–0.522) and *Quercus aucheri* (–0.382) were located at the left end, further emphasizing ecological niche differentiation (Table 4).

The combined ordination diagram clearly illustrates the ecological separation of the three vegetation units identified by the cluster analysis. Plots characterized by *Pinus brutia* var. *brutia* were mainly concentrated on the negative side of Axis 1 and the positive side of Axis 3, corresponding to habitats characterized by relatively higher elevation and precipitation. Plots associated with *Quercus aucheri* occupied intermediate positions within the ordination space and reflected transitional ecological conditions. In contrast, plots characterized by *Sarcopoterium spinosum* were primarily located on the positive side of Axis 1 and the negative side of Axis 3, indicating their association with lower-elevation and relatively drier habitats. These distribution patterns are consistent with the relationships observed between the diagnostic species of each vegetation unit and the main environmental gradients (Figure 5; Table 4).

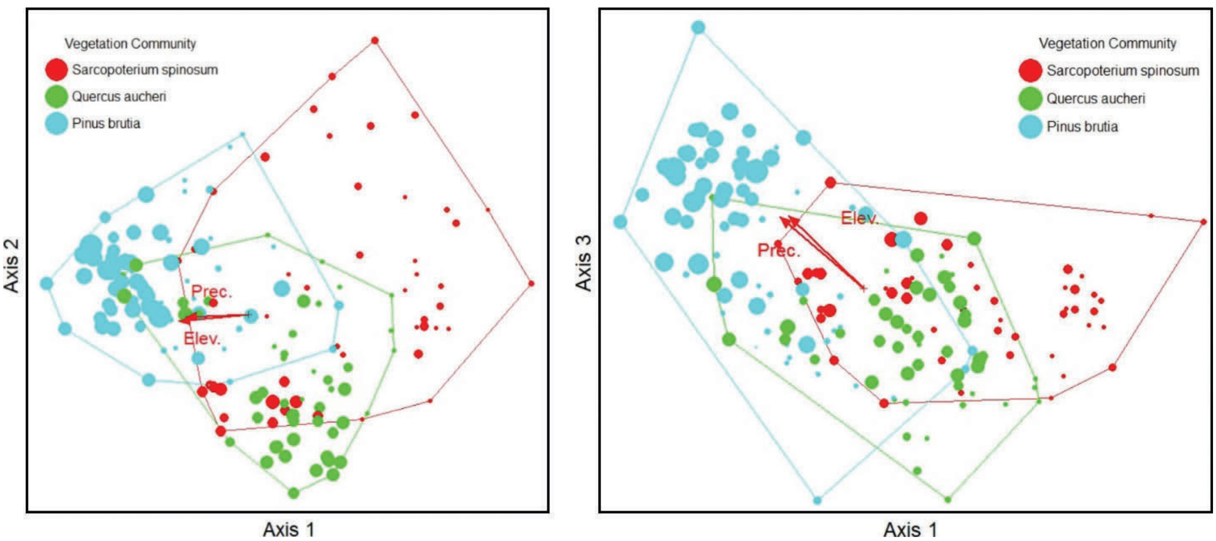


Figure 5: Bray–Curtis ordination of all sampling plots showing the distribution of the three vegetation units characterized by *Sarcopoterium spinosum, Quercus aucheri*, and *Pinus brutia* var. *brutia* along (A) Axes 1–2 and (B) Axes 1–3. Colors indicate the vegetation units: red = *Sarcopoterium spinosum* plots, green = *Quercus aucheri* plots, and cyan = *Pinus brutia* var. *brutia* plots. The thin coloured polygons represent the outer distribution limits (convex hulls) of the sampling plots belonging to each vegetation unit in the ordination space. Environmental arrows indicate the main gradients correlated with the ordination axes; arrow direction shows the direction of increasing values, and arrow length reflects the strength of the relationship with the ordination configuration. Only environmental variables with correlation coefficients of $|r| \geq 0.50$ were displayed in order to improve graphical clarity, although variables with lower correlations were also considered in the interpretation of the ordination results. Symbol size reflects the relative abundance-cover values derived from the Braun–Blanquet data matrix, with larger symbols indicating higher abundance-cover values and smaller symbols indicating lower abundance-cover values.

Slika 5: Razporeditev vseh vzorčnih ploskev v Bray–Curtis ordinaciji treh vegetacijskih enot z vrstami *Sarcopoterium spinosum, Quercus aucheri* in *Pinus brutia* var. *brutia* vzdolž (A) osi 1–2 in (B) osi 1–3. Barve označujejo vegetacijske enote: rdeča = ploskve z *Sarcopoterium spinosum*, zelena = ploskve z *Quercus aucheri* in svetlo modra = ploskve s *Pinus brutia* var. *brutia*. Poligoni predstavljajo zunanjo mejo razporeditve ploskev (convex hulls), ki pripadajo isti vegetacijski enoti. Puščice predstavljajo glavne okoljske gradiente; smer puščice predstavlja smer povečevanja vrednosti, dolžina pa odraža moč povezave s konfiguracijo ordinacije. Prikazane so samo okoljske spremenljivke s korelacijskimi koeficienti $|r| \geq 0.50$ zaradi preglednosti grafa, čeprav smo spremenljivke z manjšo korelacijo upoštevali tudi pri interpretaciji rezultatov. Velikost simbolov predstavlja relativno velikost abundance in pokrovnosti po Braun-Blanquetu, kjer veliki simboli predstavljajo večje vrednosti, manjši pa manjše.

Table 4: Relationships of diagnostic taxa with the Bray–Curtis ordination axes.
Tabela 4: Razmerje diagnostičnih taksonov z ordinacijskimi osmi analize Bray–Curtis.

Taxon	Axis 1	Axis 2	Axis 3
Pinus brutia	-0.796	0.287	0.542
Quercus aucheri	0.195	-0.379	-0.382
Sarcopoterium spinosum	0.581	0.314	-0.522
Andropogon distachyos	0.505	0.409	-0.209
Crepis commutata	0.585	-0.085	-0.320
Valantia hispida	0.574	-0.126	-0.276
Aristolochia guichardii	-0.524	0.159	0.488
Asparagus aphyllus subsp. *orientalis*	-0.541	-0.263	0.233
Crepis fraasi	-0.576	0.117	0.475
Allium subhirsutum	0.193	-0.469	-0.286
Anagyris foetida	0.084	-0.442	-0.156
Clematis cirrhosa	-0.128	-0.554	0.019
Laurus nobilis	-0.133	-0.414	0.139
Phlomis lycia	0.251	-0.367	-0.371

Symbol size reflects the relative abundance-cover values derived from the Braun–Blanquet data matrix, with larger symbols indicating higher abundance-cover values and smaller symbols indicating lower abundance-cover values.

The classification analyses showed that the vegetation of the Bozburun Peninsula consists of three distinct plant communities corresponding to different vegetation types: pine forest (Group 3), maquis (Group 2), and phrygana (Group 1).

Cluster 1 *Andropogono distachyi-Sarcopoterietum spinosi* Akbaş & Varol ass. nova

This association represents habitats typical of open areas, where short-lived therophytes and dwarf shrubs coexist, often of secondary origin and susceptible to disturbance (Figure 6). The community occurs between 34 and 296 m a.s.l. and is dominated by *Sarcopoterium spinosum* and *Andropogon distachyos*. It is distributed on red-brown forest soils, non-calcareous brown forest soils, colluvial soils, and red Mediterranean soils developed on limestone bedrock. The community occurs under a wide range of aspects (N, S, E, W, NE, NW, SE, and SW) and on slopes ranging from 2° to 35°.

Structurally, it consists of two vertical layers:

(a) a herb layer with a cover of 15–90% and a height of 0.4–1 m,

(b) a shrub layer with a cover of 45–95% and a height of 0.5–5 m.

Diagnostic species: *Andropogon distachyos*, *Crepis commutata*, *Sarcopoterium spinosum,* and *Valantia hispida*.

Constant species: *Asphodelus aestivus, Bromus fasciculatus, Crepis commutata, Fumana arabica, Genista acanthoclada, Leontodon tuberosus, Plantago cretica, Trifolium scabrum,* and *Valantia hispida*.

Dominant species: *Andropogon distachyos*, *Crepis commutata*, *Sarcopoterium spinosum,* and *Valantia hispida.*

Figure 6: *Andropogon distachyos* and *Sarcopoterium spinosum* community.
Slika 6: Združba z vrstama *Andropogon distachyos* in *Sarcopoterium spinosum*.

Figure 7: *Allium subhirsutum* and *Quercus aucheri* community.
Slika 7: Združba z vrstama *Allium subhirsutum* in *Quercus aucheri*.

Cluster 2 *Allio subhirsuti-Quercetum aucheri* Akbaş & Varol ass. nova

This community represents more stable habitats characterized by Mediterranean woody and perennial species (Figure 7). It occurs between 37 and 406 m a.s.l. and shows progressive development within maquis vegetation. The community is dominated by *Allium subhirsutum* and *Quercus aucheri*. It is distributed on red-brown forest soils and red Mediterranean soils developed on limestone bedrock. The community occurs under various aspects (N, S, E, W, NE, NW, SE, and SW) and on slopes ranging from 10° to 33°.

Structurally, the community consists of two vertical layers:

(a) a herb layer with a cover of 40–90% and a height of 0.2–1 m, and

(b) a shrub layer with a cover of 60–90% and a height of 3–7 m.

Diagnostic species: *Allium subhirsutum, Anagyris foetida, Clematis cirrhosa, Laurus nobilis, Phlomis lycia, Quercus aucheri.*

Constant species: *Anthemis chia, Arabis verna, Arisarum vulgare, Briza maxima, Euphorbia acanthothamnos, Geranium purpureum, Lagoecia cuminoides, Parietaria lusitanica, Sherardia arvensis, Trifolium campestre* subsp. *campestre* var. *campestre, Trifolium stellatum* var. *stellatum.*

Dominant species: *Arabis verna, Clematis cirrhosa, Euphorbia acanthothamnos, Geranium purpureum, Lagoecia cuminoides, Phillyrea latifolia, Quercus aucheri.*

Cluster 3 *Aristolochio guichardii-Pinetum brutiae* Akbaş & Varol ass. nova

This group represents less disturbed Mediterranean forest ecosystems approaching climax conditions, where well-developed *Pinus brutia* forests and some maquis elements coexist (Figure 8). The community occurs between 75 and 630 m a.s.l. and shows progressive development within forest vegetation. The community is physiognomically dominated by *Pinus brutia* var. *brutia* and floristically characterized by *Aristolochia guichardii*. It is distributed on red-brown forest soils, non-calcareous brown forest soils, and red Mediterranean soils developed on limestone bedrock. The community occurs under a wide range of aspects (N, S, E, W, NE, NW, SE, and SW) and on slopes ranging from 5° to 40°.

Structurally, the community consists of three vertical layers:

(a) a herb layer with a cover of 5–55% and a height of 0.45–1 m,

(b) a shrub layer with a cover of 15–70% and a height of 1–5 m, and

(c) a tree layer with a cover of 65–90% and a height of 20–30 m.

Figure 8: *Aristolochia guichardii* and *Pinus brutia* var. *brutia* community.
Slika 8: Združba z vrstama *Aristolochia guichardii* in *Pinus brutia* var. *brutia*.

Diagnostic species: *Aristolochia guichardii, Asparagus aphyllus* subsp. *orientalis, Crepis fraasi and Pinus brutia* var. *brutia.*

Constant species: *Aristolochia guichardii, Asparagus aphyllus* subsp. *orientalis, Cistus creticus, Crepis fraasi, Dactylis glomerata* subsp. *hispanica, Galium heldreichii, Lathyrus aphaca* var. *pseudoaphaca, Oryzopsis miliacea subsp. thomasii, Phillyrea latifolia, Phlomis bourgaei, Pinus brutia* var. *brutia, Quercus coccifera, Quercus pubescens, Salvia fruticosa, Smilax aspera, Sonchus bulbosus subsp. microcephalus, Torilis arvensis* subsp. *purpurea*.

Dominant species: *Arbutus andrachne*, *Pinus brutia* var. *brutia*, *Quercus coccifera, Styrax officinalis*.

4. Discussion

The present study identified three ecologically and floristically distinct vegetation units corresponding to phrygana, maquis, and *Pinus brutia* forest vegetation. These units were consistently supported by numerical classification and ordination analyses and represent the major vegetation types occurring on the Bozburun Peninsula. Furthermore, the floristic composition, ecological characteristics, and diagnostic species of these vegetation units justified the description of three new syntaxa, contributing to the syntaxonomical knowledge of southwestern Anatolia.

The Bray–Curtis ordination results support the ecological differentiation of the three vegetation units identified by clustering. *Pinus brutia* plots were associated with relatively higher elevation and precipitation, reflecting the development of forest communities under comparatively moister conditions. *Quercus aucheri* plots occupied an intermediate position in the ordination space, indicating the transitional character of the maquis vegetation between forest and phrygana formations. In contrast, *Sarcopoterium spinosum* plots were related to lower-elevation and drier habitats, consistent with the xerophytic character of phrygana vegetation. The widespread occurrence of *S. spinosum* may also be associated with vegetation degradation processes in Mediterranean ecosystems, since the species is commonly regarded as an indicator of degraded maquis and secondary phrygana communities formed under long-term human impact and grazing pressure (Naveh & Dan, 1973; Barbero et al., 1990; Quézel & Médail, 2003).

Among the clustering methods applied in this study, the Sørensen–Flexible Beta method produced the most homogeneous and ecologically meaningful results, reflecting the mosaic structure of Mediterranean vegetation and species turnover in transitional zones. Particularly in areas where maquis and phrygana communities intermix, the Sørensen method's sensitivity to shared species enabled a more accurate assessment of floristic similarity, resulting in the most statistically robust classification, as confirmed by the MRPP analysis.

The high indicator values obtained from the IndVal analysis statistically confirm that the identified vegetation units are floristically well differentiated. This indicates that the plant communities on the peninsula are not merely visually defined groupings but represent ecologically distinct assemblages.

The secondary environmental data matrix used in the ordination analysis (including variables such as elevation, slope, aspect, and annual precipitation) enabled interpretation beyond classifications based solely on species composition. In particular, the Pearson correlations of environmental variables with Axis 1 and Axis 3 allowed a quantitative interpretation indicating that elevation and precipitation gradients constitute the primary drivers of species distribution in the study area.

According to the results, although the combination of Axis 1 and Axis 2 mathematically represents the main structure by explaining 28.2% of the total variation, the relationships between vegetation components and the main environmental gradients (elevation and precipitation) display a more ecologically meaningful differentiation in the Axis 1–3 plane (25.4%). In particular, the contrasting positions of *Pinus brutia* (0.542) and *Sarcopoterium spinosum* (–0.522) along Axis 3 indicate that this axis better reflects the moisture and elevation regime of the study area. This suggests that vegetation patterns in the study area are shaped not only by the primary axes with higher mathematical weight but also by vertical gradients that respond more specifically to climatic factors. Consequently, the clearer species turnover observed along this vertical gradient appears to be a key factor determining the ecological boundary between phrygana and forest formations in the region.

In order to place the vegetation units identified in this study within a broader phytosociological context, the results were evaluated in comparison with previously described syntaxa from southwestern and southern Türkiye.

Recent syntaxonomic studies have emphasized the considerable floristic and ecological heterogeneity of Mediterranean *Pinus brutia* forests across the Mediterranean Basin (Bonari et al., 2021). Various *Pinus brutia* forest associations have been described from southwestern and southern Türkiye. *Aetheorhiza–Pinetum brutiae* and *Phlomido bourgaei–Pinetum brutiae* were described from the Marmaris region (Vural et al., 1995; Akman et al., 1998), whereas *Junipero phoeniceae–Pinetum brutiae* was reported from the Bodrum Peninsula (Akman et al., 1998). Additional associations reported from southern Mediterranean Türkiye include *Asparago acutifoli–Pinetum brutiae* from Finike (Karaköse & Terzioğlu, 2021), as well as *Glycyrrhizo asymmetricae–Pinetum brutiae* and *Phlomido leucophractae–Pinetum brutiae* from the Antalya Gulf region (Kurt et al., 2015).

However, all these associations differ floristically and ecologically from the *Pinus brutia* forest association described in the present study. The consistent presence and diagnostic value of *Aristolochia guichardii*, together with the differential species combination observed in our relevés, clearly distinguish the present association from previously described *Pinus brutia* associations. In contrast to the Marmaris and Bodrum communities, which are characterized by different shrub-layer dominants and Mediterranean companion species, the present association is distinguished by the consistent occurrence of *Aristolochia guichardii, Crepis fraasi*, and *Asparagus aphyllus* subsp. *orientalis,* together with its distinctive floristic composition. Therefore, *Aristolochio guichardii–Pinetum brutiae* Akbaş et Varol ass. nova is described as a new association (Table 5).

Several macchia associations have been described from southwestern Türkiye. In the Bodrum Peninsula, the *Arbutus andrachne–Calicotome villosa* and *Umbilicus horizontalis–Olea europaea* communities were reported (Aytepe & Varol, 2025). Additional sclerophyllous macchia associations have been identified from different parts of southwestern and southern Türkiye under various alliances of *Quercetea ilicis* (e.g., Sağlam, 2013; Karaköse & Terzioğlu 2021; Kavgacı et al., 2021).

However, these macchia associations differ floristically from the association described in the present study. The dominance of *Quercus aucheri*, together with the diagnostic presence of *Allium subhirsutum, Anagyris foetida, Clematis cirrhosa,* and *Laurus nobilis*, clearly distinguishes the present association from previously described macchia associations. In contrast to the Bodrum macchia communities, where *Olea europaea* or *Calicotome villosa* constitute the main woody elements, *Quercus aucheri* forms the dominant structural component of the present stands, while *Olea europaea* occurs only as an accompanying species. Furthermore, the limited contribution of *Quercus coccifera* and the particular combination of thermophilous Mediterranean species support the distinct syntaxonomical position of this association. Therefore, *Allio subhirsuti–Quercetum aucheri* Akbaş et Varol ass. nova is described as a new association (Table 6).

Several Mediterranean phrygana associations dominated by *Sarcopoterium spinosum* have been described from Türkiye and other parts of the eastern Mediterranean, such as *Asphodelo aestivi–Sarcopoterietum spinosi*, *Teucrio micropodioidis–Sarcopoterietum spinosi*, and *Asphodelo–Sarcopoterietum spinosi* (Géhu, 1987; Durmuşkahya, 2005; Şık &

Gemici 2010). These associations are generally characterized by the dominance of *Sarcopoterium spinosum* accompanied by chamaephytic and hemicryptophytic elements typical of degraded Mediterranean shrublands.

The newly proposed *Andropogono distachyi–Sarcopoterietum spinosi* Akbaş & Varol ass. nova differs from these syntaxa in several aspects (Table 7). Although *Sarcopoterium spinosum* is an important structural component, *Andropogon distachyos* is a co-dominant and physiognomically significant element, giving the association a more open, herb-rich character.

Furthermore, the presence and diagnostic role of *Crepis commutata* and *Valantia hispida*, together with the relatively high representation of therophytic taxa, reflect the open and seasonally dry character of the habitats occupied by the association and distinguish it from previously described *Sarcopoterietum* associations.

In contrast to *Asphodelo aestivi–Sarcopoterietum spinosi*, which develops on specific lithological substrates and shows a different floristic composition, and *Teucrio micropodioidis–Sarcopoterietum spinosi*, characterized by a stronger dominance of chamaephytes, the present association reflects a transitional structure between phrygana and open Mediterranean grass-dominated formations.

Based on phytosociological analyses and the floristic composition of the relevés, the studied vegetation units were evaluated using the Braun-Blanquet approach and assigned to the following syntaxonomic categories. The hierarchical position of the newly described syntaxa, together with their related higher units, is summarised below:

Quercetea ilicis Br.-Bl. ex A. & O. Bolòs 1950
- *Quercetalia ilicis* Br.-Bl. ex Molinier 1934 em. Rivas-Martínez 1975
  - *Quercion ilicis* Br.-Bl. ex Molinier 1934 em. Rivas-Martínez 1975
    - *Aristolochio guichardii-Pinetum brutiae* Akbaş & Varol ass. nov. hoc loco (Holotypus: Table 5, Relevé: 49)

Quercetea ilicis Br.-Bl. ex A. & O. Bolòs 1950
- *Pistacio lentisci-Rhamnetalia alaterni* Rivas-Martínez 1975
  - *Oleo sylvestris-Ceratonion siliquae* Braun-Blanq. ex Guin. & Drouineau 1944
    - *Allio subhirsuti-Quercetum aucheri* Akbaş & Varol ass. nov. hoc loco (Holotypus: Table 6, Relevé: 17)

Cisto-Micromerietea Oberdorfer 1954
- *Cisto-Micromerietalia* Oberdorfer 1954
  - *Cistion orientalis* Oberdorfer 1954
    - *Andropogono distachyi-Sarcopoterietum spinosi* Akbaş & Varol ass. nov. hoc loco (Holotypus: Table 7, Relevé: 67)

Conclusion

This study elucidated the vegetation structure of the Bozburun Peninsula using both classical phytosociological approaches and modern numerical analyses. The findings indicate that topographic factors, particularly elevation and the associated precipitation gradient, are the primary determinants shaping the distribution of plant communities across the peninsula. The integration of numerical methods, including cluster analysis, Bray–Curtis ordination, MRPP, and Indicator Species Analysis (IndVal), contributed to a more objective delineation of vegetation unit boundaries.

In conclusion, the Bozburun Peninsula represents an important centre of Mediterranean vegetation diversity and ecological heterogeneity. The numerical analyses conducted in this study revealed three well-defined vegetation units corresponding to phrygana, maquis, and Pinus brutia forest vegetation. Furthermore, three new syntaxa, namely *Andropogono distachyi–Sarcopoterietum spinosi*, *Allio subhirsuti–Quercetum aucheri*, and *Aristolochio guichardii–Pinetum brutiae*, are described and documented for the first time. These syntaxa contribute substantially to the syntaxonomical knowledge of southwestern Anatolia and represent important components of the biodiversity of the Bozburun Peninsula.

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Research data availability

The vegetation data and associated datasets generated and analysed during the current study are available in the published paper and from the corresponding author upon reasonable request.

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Appendix 1

Frequency values and diagnostic parameters (Observed Indicator Values (Observed IV), Mean Indicator Values (Mean IV), standard deviation (S.Dev.), and associated p-values) of taxa recorded in the forest community.

Taxa	Observed IV (%)	Mean IV (%)	S. Dev.	p-value
Pinus brutia var. *brutia*	89.5	18.7	2.48	0.0002
Styrax officinalis	50	13.3	2.44	0.0002
Crepis fraasi	47.7	11.1	2.33	0.0002
Aristolochia guichardii	45.2	10.2	2.28	0.0002
Arbutus andrachne	44.6	11.2	2.33	0.0002
Quercus coccifera	43.9	27.3	2.11	0.0002
Smilax aspera	42.6	22	2.41	0.0002
Asparagus aphyllus subsp. *orientalis*	39.7	24.8	2.3	0.0002
Phillyrea latifolia	36.5	12	2.33	0.0002
Cistus creticus	34.3	26.6	2.17	0.0026
Sonchus bulbosus subsp. *microcephalus*	32.9	7.7	2.1	0.0002
Quercus pubescens	31.4	7.5	2.1	0.0002
Galium heldreichii	30	7.2	2	0.0002
Phlomis bourgaei	28.3	10.2	2.26	0.0002
Hypericum empetrifolium	28	13.6	2.48	0.0002
Salvia fruticosa	27.6	17.3	2.5	0.0026
Oryzopsis miliacea subsp. *thomasii*	26.8	13.3	2.47	0.0004
Vicia pubescens	26.7	14	2.48	0.0004
Torilis arvensis subsp. *purpurea*	26.3	17.9	2.53	0.0062
Quercus infectoria subsp. *veneris*	25.3	7	2.06	0.0002
Dactylis glomerata subsp. *hispanica*	22.1	21.7	2.48	0.3433
Teucrium divaricatum subsp. *divaricatum*	20	8.4	2.14	0.0004
Cupressus sempervirens	20	5.4	1.82	0.0002
Oryzopsis coerulescens	19.7	16.3	2.49	0.0944
Lathyrus aphaca var. *pseudoaphaca*	19.6	14.2	2.44	0.0254
Carlina corymbosa	17.5	7.9	2.09	0.0024
Trifolium lappaceum	17.1	4.9	1.75	0.0006
Myrtus communis subsp. *communis*	15.4	5.2	1.86	0.0004
Carex distachya var. *phyllostachioidea*	13	6.2	1.92	0.0056
Picnomon acarna	13	6.3	1.95	0.0086
Stipa bromoides	14.3	4.4	1.73	0.0004
Limodorum abortivum var. *abortivum*	14.3	4.4	1.71	0.0004
Brachypodium pinnatum	12.9	4.1	1.68	0.001
Euphorbia apios	12.9	4.1	1.69	0.0006
Stachys cretica subsp. *smyrnaea*	10	5.2	1.85	0.0292
Crucianella latifolia	10	5.2	1.89	0.0348
Dioscorea communis	8.1	8.2	2.15	0.3817
Campanula lyrata subsp. *lyrata*	5.5	4.7	1.7	0.1766
Scorzonera elata	5.3	6.5	1.95	0.6385
Vicia hirsuta	5	4.1	1.67	0.2827
Asperula brevifolia	4.4	4.4	1.74	0.4509
Blackstonia perfoliata subsp. *perfoliata*	4.4	4.4	1.67	0.4393
Scaligeria napiformis	3.9	4.7	1.72	0.5659

Appendix 2

Frequency values and diagnostic parameters (Observed Indicator Values (Observed IV), Mean Indicator Values (Mean IV), standard deviation (S.Dev.), and associated p-values) of taxa recorded in the maquis community.

Taxa	Observed IV (%)	Mean IV (%)	S. Dev.	p-value
Euphorbia acanthothamnos	57.3	16.5	2.5	0.0002
Clematis cirrhosa	51.2	18.5	2.51	0.0002
Arabis verna	49.8	10.7	2.27	0.0002
Quercus aucheri	48.5	16.5	2.52	0.0002
Phillyrea latifolia	46.7	22.8	2.41	0.0002
Geranium purpureum	46.2	19.5	2.49	0.0002
Lagoecia cuminoides	45.9	16.6	2.53	0.0002
Parietaria lusitanica	44.6	14.4	2.45	0.0002
Anagyris foetida	44.2	9.8	2.25	0.0002
Muscari comosum	42.3	15.6	2.5	0.0002
Veronica cymbalaria	41.4	12.4	2.37	0.0002
Briza maxima	39.9	16.1	2.53	0.0002
Allium subhirsutum	39.2	11.8	2.33	0.0002
Sherardia arvensis	38.3	16.1	2.48	0.0002
Arisarum vulgare	37.8	15.3	2.51	0.0002
Geranium lucidum	37.4	12.5	2.44	0.0002
Orlaya daucoides	36.8	10.5	2.32	0.0002
Melilotus italicus	36.1	7	2.02	0.0002
Phlomis lycia	36.1	11.9	2.39	0.0002
Trifolium clypeatum	36	8.2	2.15	0.0002
Laurus nobilis	34.7	11.7	2.44	0.0002
Rumex tuberosus subsp. *creticus*	34.3	7.2	2.08	0.0002
Rhagadiolus stellatus	33.1	8.9	2.22	0.0002
Rubia tenuifolia subsp. *tenuifolia*	31.5	18	2.59	0.0008
Olea europaea	31.5	15.5	2.48	0.0002
Cyclamen hederifolium	30.2	15.1	2.49	0.0004
Bromus diandrus	29.9	14.6	2.45	0.0004
Trifolium grandiflorum	29.9	13.6	2.48	0.0002
Trifolium stellatum var. *stellatum*	29.6	15.4	2.48	0.0004
Avena sterilis subsp. *ludoviciana*	28.4	6.5	1.97	0.0002
Hordeum bulbosum	26.9	6.7	2.02	0.0002
Valeriana dioscoridis	26.4	6.2	1.96	0.0002
Securigera cretica	26.1	5.7	1.91	0.0002
Scrophularia peregrina	24.9	6.5	1.96	0.0002
Trifolium campestre subsp. *campestre* var. *campestre*	24.5	24.6	2.38	0.4219
Mandragora autumnalis	24.3	7.2	2.02	0.0002
Ruscus aculeatus	24.2	7	2	0.0002
Filago eriocephala	24.1	9.3	2.22	0.0002
Bryonia cretica	24	5	1.83	0.0002
Valerianella muricata	24	5	1.8	0.0002
Myosotis ramosissima	23	9.6	2.25	0.0006
Orchis anatolica	22	4.7	1.74	0.0002
Vicia villosa subsp. *dasycarpa*	20.7	5	1.78	0.0002
Umbilicus horizontalis	20.5	6.8	2.01	0.0002
Ophrys holosericea subsp. *holosericea*	19.1	5.7	1.88	0.0002
Cynosurus echinatus	19	16.5	2.5	0.165
Origanum onites	18.9	21.3	2.49	0.8576

Taxa	Observed IV (%)	Mean IV (%)	S. Dev.	p-value
Minuartia hybrida subsp. *hybrida*	18.6	5.2	1.88	0.0004
Ranunculus neapolitanus	18.5	6.3	1.98	0.0004
Crepis commutata	18.2	7	2.11	0.0012
Crataegus monogyna var. *monogyna*	18	7.9	2.11	0.0018
Ornithogalum narbonense	16.9	7.7	2.13	0.0012
Melica minuta	16.3	12.9	2.38	0.0966
Anthemis chia	16.2	7.2	2.02	0.0024
Sanguisorba verrucosa	15.9	6	1.96	0.0018
Campanula drabifolia	15	6.7	1.96	0.0028
Pistacia lentiscus	14.8	13.6	2.43	0.2853
Trigonella monspeliaca	14.2	4.1	1.71	0.0012
Daphne gnidioides	13.9	11.7	2.38	0.171
Silene italica	13.9	8.9	2.19	0.0314
Linum bienne	13.6	7.2	2.05	0.0118
Knautia integrifolia var. *bidens*	13.5	6.8	2.01	0.0126
Arrhenatherum palaestinum	13.4	7	2.1	0.0126
Scandix australis subsp. *grandiflora*	13.3	6.5	1.96	0.0074
Trifolium hirtum	13.1	8.6	2.13	0.049
Vicia villosa subsp. *eriocarpa*	12.9	7.2	2.03	0.0202
Lamium amplexicaule var. *amplexicaule*	12.7	4.4	1.68	0.0018
Senecio vernalis	12.7	4.4	1.75	0.0042
Vicia cassia	12.6	4.7	1.8	0.003
Trifolium tomentosum var. *tomentosum*	12.4	7.7	2.12	0.0298
Cerastium glomeratum	12.3	8	2.13	0.0424
Hymenocarpus circinnatus	12	6.5	1.97	0.0228
Securigera parviflora	11.4	6.5	1.98	0.0302
Fritillaria sibthorpiana	10	4.4	1.71	0.0138
Galium brevifolium subsp. *brevifolium*	9.7	4.4	1.7	0.016
Bromus intermedius	9.6	6.2	1.93	0.0644
Geranium molle	8.7	6.7	1.97	0.1634
Medicago minima var. *minima*	8.3	5	1.82	0.0794
Torilis leptophylla	7.5	5.2	1.81	0.1258
Pallenis spinosa	7.4	4.4	1.68	0.0868
Ranunculus asiaticus	7.1	4.4	1.72	0.0856
Verbascum propontideum	3.5	4.4	1.72	0.7862

Appendix 3

Frequency values and diagnostic parameters (Observed Indicator Values (Observed IV), Mean Indicator Values (Mean IV), standard deviation (S.Dev.), and associated p-values) of taxa recorded in the garrigue community.

Taxa	Observed IV (%)	Mean IV (%)	S. Dev.	p-value
Sarcopoterium spinosum	47.2	12.9	2.39	0.0002
Andropogon distachyos	36.3	9.7	2.29	0.0002
Valantia hispida	35.1	10.3	2.31	0.0002
Crepis commutata	32.8	12.3	2.42	0.0002
Asphodelus aestivus	29.3	23.5	2.4	0.0252
Genista acanthoclada	28.2	8.9	2.22	0.0002
Trifolium scabrum	25.3	7.3	2.1	0.0002
Leontodon tuberosus	24.9	8.2	2.14	0.0004

Taxa	Observed IV (%)	Mean IV (%)	S. Dev.	p-value
Anagallis arvensis var. *caerulea*	24.8	12.5	2.4	0.0008
Biscutella didyma	24.7	8	2.18	0.0004
Fumana arabica	24.4	6.3	1.93	0.0002
Bromus fasciculatus	24.1	7	2.05	0.0002
Convolvulus althaeoides	24	6.3	1.94	0.0002
Cistus salviifolius	22.5	13.2	2.43	0.0034
Euphorbia peplus var. *peplus*	22.1	15.5	2.52	0.0214
Urospermum picroides	21.2	12.5	2.36	0.0042
Plantago cretica	21.1	5.5	1.86	0.0002
Catapodium rigidum subsp. *rigidum* var. *rigidum*	20.8	9.8	2.27	0.001
Onobrychis caput-galli	19.6	6.5	1.94	0.0004
Salvia viridis	18.4	4.1	1.71	0.0002
Drimia maritima	18	12.1	2.4	0.027
Bromus rigidus	17.5	5	1.81	0.0002
Calicotome villosa	17	11.2	2.36	0.0302
Sideritis curvidens	16.6	4.5	1.77	0.0002
Phagnalon graecum	15.9	7	1.99	0.001
Scorpiurus subvillosus var. *subvillosus*	15.8	5.9	1.92	0.001
Linum strictum var. *spicatum*	15.8	5.2	1.82	0.0006
Gastridium phleoides	15.5	4.7	1.78	0.0004
Tuberaria guttata	15	4.1	1.69	0.0006
Rostraria cristata var. *cristata*	14.5	8	2.13	0.0128
Lavandula stoechas subsp. *stoechas*	13.8	9.1	2.24	0.0412
Avena sterilis subsp. *sterilis*	13.1	6	1.9	0.0062
Micromeria myrtifolia	13.1	14.2	2.5	0.5741
Crucianella imbricata	12	11	2.39	0.2721
Lotus peregrinus	11.2	4.1	1.7	0.0058
Petrorhagia dubia	10.3	5.2	1.86	0.0232
Trifolium angustifolium	10	7.4	2.01	0.1162
Ranunculus paludosus	9.8	6.2	1.93	0.0644
Trifolium nigrescens subsp. *petrisavii*	9.5	6.7	2	0.0922
Helichrysum stoechas subsp. *barrelieri*	9	6	1.97	0.0786
Gagea graeca	8.8	5.7	1.91	0.0822
Vulpia ciliata subsp. *ciliata*	8.8	4.1	1.67	0.0222
Pyrus amygdaliformis var. *lanceolata*	8.2	6.7	1.98	0.1616
Galium murale	6.7	4.7	1.73	0.156
Plantago lagopus	6.2	5	1.8	0.2599
Aira elegantissima subsp. *ambigua*	6	5.3	1.87	0.3723
Bromus hordeaceus subsp. *hordeaceus*	5.7	4.1	1.67	0.1766
Erodium cicutarium subsp. *cicutarium*	5.7	4.2	1.72	0.189
Parentucellia latifolia subsp. *latifolia*	5.2	4.4	1.73	0.3249
Onosma frutescens	4.9	4.7	1.7	0.4175
Torilis arvensis subsp. *elongata*	4.7	6.6	2.03	0.783
Silene cretica	3.8	4.1	1.71	0.5575
Daucus guttatus	3	4.9	1.73	0.9372
Medicago orbicularis	2.4	4.1	1.69	0.8322

Table 5: Vegetation table of *Aristolochio guichardii-Pinetum brutiae* Akbaş & Varol ass. nov. (Holotypus: Sampling plot no 49).
Tabela 5: Vegetacijska tabela asociacije *Aristolochio guichardii-Pinetum brutiae* Akbaş & Varol ass. nov. (Holotip: popis št. 49).

	Sampling Plot No:	146	134	145	141	155	49*	50	135	131	166	161	48	43	130	132	156	46	108	121	114	168	138
LIFE FORMS	Size of sampling plot (m^2)	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900
	Altitude (m)	578	410	580	550	450	410	388	420	400	630	560	400	120	415	435	400	409	110	75	336	630	536
	Exposure (°)	NW	E	NW	W	SW	SW	N	NE	SW	NE	SW	N	W	N	NW	NE	SW	W	E	S	NW	NW
	Inclination (°)	5	15	5	20	25	15	10	10	20	20	20	30	26	10	15	15	11	10	40	15	10	10
	Coverage of trees (%)	75	75	80	90	75	90	80	70	80	75	85	65	70	85	80	90	80	75	75	85	85	90
	Height of trees (m)	25	30	20	25	30	25	25	25	25	25	25	20	20	25	30	25	25	30	30	25	25	25
	Coverage of shrubs (%)	35	25	15	35	40	15	20	45	30	20	30	50	50	45	20	30	60	60	70	60	25	25
	Height of shrubs (m)	3	4	2	3	5	3	4	4	1	3	3	3	2	2	4	2	3	3	3	3	4	3
	Coverage of herbs (%)	25	10	10	5	5	25	55	15	40	5	5	20	60	30	30	5	30	25	5	5	5	7
	Height of herbs (cm)	100	100	100	100	100	45	40	100	100	100	100	45	50	100	100	100	50	100	100	100	100	100
	Bedrock	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.
	Diagnostic species																						
Mezo Ph	*Pinus brutia*	55	55	55	55	55	55	55	44	55	55	55	44	44	55	55	55	44	55	55	55	55	55
T	*Crepis fraasii*	+1	+1	+1	+1	.	+1	+1	+1	11	+1	+1	11	+1	22	21	+1	+1	11	+1	+1	+1	.
H	*Aristolochia guichardii*	11	.	+1	+1	+1	33	22	+1	11	+1	+1	+1	+1	.	.	+1	+1	.	.	11	.	+1
Nan. Ph	*Asparagus aphyllus* subsp. *orientalis*	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	11	+1	+1	11	+1	+1
Character species of the alliance *Quercion ilicis*																							
Nan. Ph	*Quercus coccifera*	22	12	22	22	22	22	33	12	12	22	22	43	.	12	12	22	43	12	22	22	22	22
Nan. Ph	*Hypericum empetrifolium*	+2	+2	.	.	.	12	12	12	+2	.	12	12	23	12	.	.	.	12	22	.	.	.
H	*Carex distachya* var. *phyllostachioidea*	+2	+2	+2	+2	+2	.	.	.	12	.	.	.	.	12	12	.	.	.	.	.	.	.
Nan. Ph	*Pistacia terebinthus* subsp. *palaestina*	+2	+2	+2	.	.	.	.	22	.	12	+2	.	+2	+2	+2	.	.	.	.	12	+2	.
Nan. Ph	*Arbutus unedo*	.	12	.	.	.	.	.	.	.	.	.	.	12	.	.	.	.	.	.	.	.	.
H	*Euphorbia characias* subsp. *wulfenii*	.	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	.	.	.	.	+1	.
Nan. Ph	*Quercus ilex*	.	.	.	.	.	.	.	.	.	.	.	.	22	.	.	.	.	.	.	.	.	.
Character species of the order *Quercetalia ilicis*																							
Nan. Ph	*Phillyrea latifolia*	22	22	+2	12	+2	12	.	22	12	.	12	.	23	12	22	.	.	.	22	12	.	.
Nan. Ph	*Laurus nobilis*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+2	+2	.
Nan. Ph	*Melissa officinalis* subsp. *altissima*	.	22	.	.	.	.	.	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nan. Ph	*Rhus coriaria*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+2	.	.	.	.	.
Ch	*Ruscus aculeatus* var. *aculeatus*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+2	.

	Sampling Plot No:	146	134	145	141	155	49*	50	135	131	166	161	48	43	130	132	156	46	108	121	114	168	138
Character species of the class *Quercetea pubescentis*																							
H	*Silene italica*	.	.	+2	.	.	+2	+2	.	.	+2	.	12	.	.	.	.	.	.	.	.	.	.
G	*Limodorum abortivum*	.	.	.	+1	.	.	.	.	.	.	.	.	.	+1	.	.	+1	.	+1	.	.	.
Nan. Ph	*Crataegus monogyna* subsp. *azarella*	.	.	+2	.	.	.	.	.	.	.	.	.	.	.	.	.	12	+2	.	.	.	.
H	*Brachypodium pinnatum*	.	.	.	.	.	.	.	.	.	12	.	.	.	.	.	.	.	.	.	.	12	.
H	*Campanula lyrata* subsp. *lyrata*	.	.	.	.	.	.	+1	.	.	.	.	+1	.	.	.	.	.	.	.	.	.	.
T	*Trifolium grandiflorum*	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
H	*Luzula forsteri*	.	.	+2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
H	*Cicer montbretii*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12
G	*Cephalanthera rubra*	.	.	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nan. Ph	*Fraxinus ornus* subsp. *cilicica*	.	.	.	.	.	.	+2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Character species of the class *Secalinetea*																							
T	*Crepis sancta*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	.
T	*Torilis nodosa*	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	.	.
Companion species																							
H	*Dactylis glomerata* subsp. *hispanica*	22	.	12	12	.	+2	12	.	12	+2	+2	12	12	.	.	.	.	22	+2	22	+2	12
G	*Cyclamen hederifolium*	+1	+1	+1	+1	.	+1	+1	+1	11	+1	.	+1	+1	.	+1	.	+1	.	.	+1	.	+1
H	*Aetheorhiza bulbosa* subsp. *microcephala*	11	+1	+1	11	+1	.	.	11	21	+1	.	.	.	22	22	11	.	.	.	.	.	11
Nan. Ph	*Phlomis bourgaei*	12	12	+2	.	12	22	12	.	.	12	+2	12	12	.	.	.	+2	.	.	.	12	.
T	*Torilis arvensis* subsp. *purpurea*	+1	+1	+1	.	+1	.	+1	+1	11	.	.	.	+1	+1	11	+1	.	+1	+1	+1	.	.
T	*Trifolium campestre*	.	.	+1	+1	+1	.	.	+1	11	.	+1	+1	+1	11	.	+1	+1	21	+1	.	.	.
T	*Lathyrus aphaca* var. *pseudoaphaca*	+1	.	+1	.	+1	.	+1	+1	+1	+1	+1	.	.	+1	+1	.	+1	22	.	+1	.	.
H	*Origanum onites*	12	12	+2	22	.	12	12	.	22	.	.	2	+2	12	12	.	12	12	.	.	.	.
H	*Vicia pubescens*	.	.	.	+1	+1	.	+1	+1	.	.	+1	+1	.	.	.	+1	.	22	+1	+1	.	.
T	*Cynosurus echinatus*	.	.	.	+1	.	.	.	.	+1	.	+1	+1	+1	+1	.	+1	.	+1	.	.	.	.
H	*Piptatherum miliaceum* subsp. *thomasii*	.	+2	+2	.	12	.	.	.	.	+2	12	.	+2	+2	.	.	.	12	.	.	.	.
H	*Carex flacca* subsp. *serrulata*	22	.	11	.	+1	.	.	.	.	.	.	.	.	11	11	.	+1	.	.	+1	+1	.
H	*Galium heldreichii*	11	+1	+1	11	.	11	.	.	11	11	.	11	.	+1	.	.	.	.	.	+1	.	+1
G	*Asphodelus aestivus*	.	.	.	.	.	11	.	.	.	.	.	+1	+1	.	.	+1	+1	+1	+1	+1	.	.
T	*Euphorbia peplus* var. *peplus*	.	+1	+1	.	.	.	+1	+1	+1	.	.	.	.	.	.	+1	.	.	.	+1	.	.
T	*Briza maxima*	.	.	.	.	.	.	.	+1	.	+1	.	.	.	.	+1	+1	.	.	.	.	.	.
Nan. Ph	*Quercus pubescens*	.	12	.	+2	+2	.	.	12	.	+2	+2	.	.	.	.	.	.	.	.	.	.	.

	Sampling Plot No:	146	134	145	141	155	49*	50	135	131	166	161	48	43	130	132	156	46	108	121	114	168	138
T	*Bromus diandrus*	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	11	+1	.	.	.	.	.	.
T	*Myosotis ramosissima* subsp. *ramosissima*	.	.	.	+1	+1	.	.	.	+1	.	.	.	.	.	+1	.	.	.	.	.	.	.
H	*Vicia villosa* subsp. *eriocarpa*	.	.	.	+1	+1	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	+1	.	.
T	*Trachynia distachya*	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	.	+1	.	.	.
T	*Veronica cymbalaria*	.	+1	.	.	+1	.	.	+1	.	.	.	.	.	.	.	.	+1	.	+1	.	.	.
H	*Vicia hirsuta*	+1	.	+1	.	.	.	.	.	11	.	.	.	.	+1	.	.	.	.	.	.	.	.
T	*Euphorbia apios*	+1	.	.	+1	.	.	+1	.	.	.	.	+1	.	.	.	.	.	.	.	.	.	+1
Nan. Ph	*Pyrus amygdaliformis* var. *amygdaliformis*	.	.	.	.	.	.	+1	.	.	.	.	.	.	.	+2	.	.	+1	.	.	+2	.
H	*Stipa bromoides*	.	12	+2	.	.	.	.	12	.	.	.	.	+2	.	.	.	.	.	.	.	.	.
Nan. Ph	*Stachys cretica* subsp. *smyrnaea*	.	.	.	+2	.	12	.	.	.	.	+2	.	.	.	.	.	.	.	.	.	.	.
H	*Carlina corymbosa*	.	.	.	.	.	.	+1	.	.	.	.	+1	.	.	.	.	+1	.	.	+1	.	.

Low-frequency taxa: *Crucianella latifolia* (T) +1 (43), +1 (161); *Tamus communis* subsp. *cretica* (G) +1 (50); *Parietaria lusitanica* (T) +1 (50), +1 (135); *Ranunculus neapolitanus* (H) +1 (50), +1 (138); *Hypericum perfoliatum* (H) +1 (50), +2 (114); *Pyrus amygdaliformis* var. *amygdaliformis* (Nan. Ph) +1 (50), +1 (108), +2 (132); *Trifolium lappaceum* (T) +1 (108), +1 (161); *Hymenocarpus circinnatus* (T) +1 (108), +1 (161); *Allium subhirsutum* (G) +1 (135); *Geranium lucidum* (T) +1(132), +1 (134), +1 (156); *Rhagadiolus stellatus* var. *edulis* (H) +1 (132), +1 (134), +1 (135); *Rubus sanctus* (Nan. Ph) +2 (138), +2 (146), 12 (155). *Blackstonia perfoliata* subsp. *perfoliata* (T) +1 (43), +1 (121); *Quercus aucheri* (Nan. Ph) 12 (108), 12 (161); *Arenaria oxypetala* (T) +1 (135), +1 (168); *Piptatherum miliaceum* subsp. *miliaceum* (H) +2 (114); *Torilis arvensis* subsp. *elongata* (T) +1 (161); *Luzula nodulosa* (H) +1 (48), +1 (168); *Sanguisorba minor* subsp. *magnolii* (H) +1 (50), +1 (135); *Urospermum picroides* (T) +1(50); *Trifolium arvense* var. *arvense* (T) +1 (155); *Trifolium stellatum* var. *stellatum* (T) +1 (161); *Arrhenatherum palaestinum* (G) 11 (130), +1 (135); *Crucianella imbricata* (T) +1 (114); *Tamus communis* subsp. *communis* (G) +1 (132); *Cytinus hypocistis* subsp. *kermesinus* (G) +1 (121), +1 (130); *Rhagadiolus stellatus* var. *stellatus* (H) +1 (138), +1 (156); *Lens ervoides* (T) +1 (131), 11 (132); *Leontodon tuberosus* (H) 11 (131), +1 (141); *Galium aparine* (T) +1 (134), +1 (135). *Scaligeria napiformis* (T) +1 (43); *Muscari comosum* (G) +1 (50); *Cytinus hypocistis* subsp. *orientalis* (G) +1 (43); *Gastridium phleoides* (T) +1 (43); *Vicia cassia* (H) +1 (43); *Rosa canina* (Nan. Ph) +1 (46); *Oenanthe aquatica* (H) +1 (48); *Tragopogon dubius* (H) +1 (48); *Rubus canescens* var. *canescens* (Nan. Ph) 32 (49); *Agrimonia eupatoria* (H) 12 (50); *Verbascum sinuatum* subsp. *adenosepalum* (H) +1 (50); *Asperula brevifolia* (Ch) +1 (108); *Daucus guttatus* (T) +1 (108); *Euphorbia acanthothamnos* (Ch) +2 (108); *Knautia integrifolia* var. *bidens* (H) +1 (166); *Lagoecia cuminoides* (T) +1 (135); *Sherardia arvensis* (T) +1 (132); *Umbilicus rupestris* (Ch) +1 (134); *Gladiolus anatolicus* (G) +1 (121); *Ptilostemon chamaepeuce* (H) +1 (114); *Anthemis tinctoria* var. *tinctoria* (H) +1 (114); *Picnomon acarna* (H) +1 (114); *Avena sterilis* subsp. *sterilis* (T) +1 (114); *Anagyris foetida* (Nan. Ph) +2 (121); *Centaurium erythraea* subsp. *turcicum* (T) +1 (121); *Bromus fasciculatus* (T) 11 (130); *Bromus rigidus* (H) +1 (131); *Onosma frutescens* (H) 11 (131); *Lathyrus sphaericus* (T) +1 (132); *Trifolium subterraneum* (T) +1 (135); *Vitex agnus-castus* (Nan. F) +2 (138); *Ranunculus velutinus* (H) +1 (146); *Verbascum pinardii* (H) +1 (155); *Avena wiestii* (T) +1 (156); *Symphytum circinale* (H) +1 (168).

Abbreviations: Cal. = calcareous bedrock; Alt. = altitude (m); Incl. = inclination (%); Tree cov. = tree layer cover (%); Shrub cov. = shrub layer cover (%); Herb cov. = herb layer cover (%); Sampling plot area = vegetation sampling plot size (m^2). Life-form abbreviations: Th = Therophyte; H = Hemicryptophyte; G = Geophyte; Ch = Chamaephyte; Nan. Ph = Nanophanerophyte; Mezo. Ph = Mesophanerophyte. Companion species = accompanying taxa without diagnostic value for the association; Low-frequency taxa = taxa recorded in a limited number of sampling plots. * = holotypus of the newly described association.

Table 6: Vegetation table of *Allio subhirsuti-Quercetum aucheri* Akbaş & Varol ass. nov. (Holotypus: Sampling plot no 17) .
Tabela 6: Vegetacijska tabela asociacije *Allio subhirsuti-Quercetum aucheri* Akbaş & Varol ass. nov. (Holotip: popis št. 17).

LIFE FORMS	**Sampling Plot No:**	**78**	**79**	**21**	**22**	**33**	**39**	**9**	**10**	**11**	**17***	**19**	**30**	**31**	**41**	**42**	**27**	**34**	**38**	**53**	**55**	**101**	**102**
	Size of sampling plot (m²)	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256
	Altitude (m)	80	100	350	371	370	366	380	339	329	321	345	397	396	300	320	275	381	406	244	291	100	110
	Exposure (°)	N	W	N	SE	SE	SE	W	S	S	SW	W	N	NW	S	SE	NE	SE	E	W	E	N	N
	Inclination (°)	10	10	20	30	25	25	25	33	33	25	15	30	30	25	30	20	23	25	20	20	10	15
	Coverage of trees (%)																						
	Height of trees (m)																						
	Coverage of shrubs (%)	60	70	90	70	80	70	80	80	75	70	90	80	70	80	80	80	70	80	80	75	75	75
	Height of shrubs (m)	5	6	4	3	4	4	5	3	6	3	4	4	4	3	5	4	3	4	3	3	3	4
	Coverage of herbs (%)	90	85	50	80	65	75	60	90	50	85	60	70	60	80	80	60	90	80	60	75	85	80
	Height of herbs (cm)	100	100	30	70	100	20	100	100	80	80	80	80	80	90	80	80	90	100	70	100	100	100
	Bedrock	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.
	Diagnostic species																						
Mic. Ph	*Quercus aucheri*	.	.	.	.	.	.	33	22	22	33	22	22	22	33	12	12	22	12	12	22	12	22
G	*Allium subhirsutum*	+1	+1	.	.	+1	11	.	.	.	+1	11	.	11	.	.	+1	.	+1	11	11	.	11
Nan. Ph	*Clematis cirrhosa*	.	+1	11	.	11	11	11	11	11	11	.	11	11	.	11	.	11	11	11	11	+1	.
Nan. Ph	*Laurus nobilis*	.	.	22	.	12	.	12	.	.	.	12	12	12	22	.	22	.	12	.	.	.	.
Nan. Ph	*Phlomis lycia*	.	.	.	12	.	12	.	22	22	12	12	12	22	12	22	12	22	.	2	.	12	12
Nan. Ph	*Anagyris foetida*	.	+2	.	.	.	.	+2	33	22	12	12	12	.	.	.	.	.	.	.	.	33	22
Character species of the alliance *Oleo-Ceratonion*																							
Nan. Ph	*Asparagus aphyllus* subsp. *orientalis*	+1	.	11	+1	+1	11	11	11	11	+1	11	+1	.	+1	+1	+1	.	+1	+1	.	.	+1
Nan. Ph	*Daphne gnidioides*	.	.	12	+2	.	.	.	.	.	.	.	.	.	.	.	12	.	.	12	12	12	12
H	*Piptatherum coerulescens*	.	.	+2	12	.	.	.	.	12	.	.	.	12	.	.	.	.	.	.	.	.	12
Nan. Ph	*Prasium majus*							.	.	.	.	.	.	.	.	.	.	.	.	22	.	12	12
Nan. Ph	*Ceratonia siliqua*	.	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Character species of the order *Pistacio-Rhamnetalia alaterni*																							
Nan. Ph	*Rubia tenuifolia* subsp. *tenuifolia*	.	+2	.	.	12	12	+2	12	.	12	12	12	12	12	12	.	12	12	12	.	.	.
Nan. Ph	*Pistacia lentiscus*	.	.	12	12	.	.	.	.	.	.	.	12	.	.	12	.	.	.	12	.	22	22
Mic. Ph	*Arbutus andrachne*	.	.	12	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nan. Ph	*Phagnalon graecum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+2

	Sampling Plot No:	78	79	21	22	33	39	9	10	11	17*	19	30	31	41	42	27	34	38	53	55	101	102
Character species of the class *Quercetea ilicis*																							
Mic. Ph	*Phillyrea latifolia*	22	12	12	22	22	22	22	22	33	22	22	.	22	.	22	22	22	22	22	.	.	.
Mic. Ph	*Quercus coccifera*	.	+2	44	33	33	22	22	33	.	22	33	22	22	22	.	33	33	33	22	33	12	33
Nan. Ph	*Olea europaea*	.	.	.	.	12	.	12	.	.	.	.	.	12	.	.	12	12	.	12	+2	12	22
T	*Geranium purpureum*	11	11	22	11	+1	11	11	.	21	+1	11	11	11	.	11	+1	.	11	11	+1	.	11
G	*Arisarum vulgare* subsp. *vulgare*	.	.	+1	+1	+1	.	.	+1	+1	+1	+1	+1	+1	.	.	.	.	+1	+1	+1	.	.
H	*Smilax aspera*	.	+1	21	11	11	11	.	.	.	.	21	11	.	.	.	21	.	11	11	.	+1	+1
T	*Trifolium clypeatum*	11	+1	.	.	.	.	11	.	.	11	11	11	+1	.	.	+1	.	+1	.	.	11	.
G	*Cyclamen hederifolium*	+1	.	11	.	+1	+1	.	.	+1	.	11	.	.	.	.	+1	+1	+1	11	.	.	.
Nan. Ph	*Pistacia terebinthus* subsp. *palaestina*	12	12	.	.	.	12	.	.	.	.	.	.	.	.	.	.	.	12	.	.	.	.
Nan. Ph	*Jasminium fruticans*							+2	+2	.	.	.	.	.	.	.	.	.	.	.	+2	.	.
Nan. Ph	*Hypericum empetrifolium*	.	.	.	.	.	.	.	.	.	+2	.	.	.	.	.	.	.	.	+2	.	.	.
H	*Carex distachya* var. *phyllostachioidea*	.	.	.	.	.	.	12	.	.	.	.	.	.	.	.	+2	.	.	.	.	.	.
Character species of the class *Cisto-Micromerietea*																							
T	*Melica minuta*	.	.	+2	.	.	.	.	.	.	12	.	.	12	.	12	12	.	22	.	.	12	+2
Nan. Ph	*Cistus creticus*	.	.	12	22	12	12	22	.	.	22	12	.	+2	.	.	12	12	.	12	22	.	12
Nan. Ph	*Calicotome villosa*	.	.	.	.	12	.	.	.	.	12	.	.	.	.	.	.	12	.	12	12	12	.
Nan. Ph	*Salvia fruticosa*	.	22	.	.	.	.	+2	.	.	.	.	.	.	.	.	12	.	.	12	.	.	.
Nan. Ph	*Micromeria myrtifolia*	+2	+2	.	.	.	.	.	.	.	12	.	.	.	.	.	+2	.	.	.	.	.	.
Ch	*Sarcopoterium spinosum*	.	.	.	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+2	12
T	*Aira elegantissima* subsp. *elegantissima*	.	.	.	.	.	11	.	.	.	.	.	.	.	.	.	.	.	11	.	.	.	11
H	*Psoralea butiminosa*	.	.	.	22	.	.	.	.	.	+2	.	.	.	.	.	.	.	.	.	.	.	.
Nan. Ph	*Helichyrisum stoechas* subsp. *barrelieri*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22	.	.	.
T	*Anthoxanthum odoratum* subsp. *odoratum*	.	.	.	.	.	.	.	.	.	11	.	.	.	.	.	.	.	.	.	.	.	.
Ch	*Genista acanthoclada*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33	.	.	.
Nan. Ph	*Cistus salviifolius*	.	.	.	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nan. Ph	*Lavandula stoechas* subsp. *stoechas*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22	.	.	.
G	*Drimia maritima*	.	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	+1	11	.
Character species of the order *Quercetea pubescentis*																							
H	*Silene italica*	.	.	.	.	12	.	+2	.	.	12	+2	.	.	.	.	12	.	12	.	.	.	.
Mic. Ph	*Crataegus monogyna* subsp. *azarella*	.	.	.	.	.	.	.	12	.	.	12	.	.	.	.	.	12	.	.	+2	+2	+2
H	*Campanula lyrata* subsp. *lyrata*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	.	.	.	.
	Secalinetea																						
T	*Orlaya daucoides*	+1	.	.	.	+1	11	+1	11	11	11	.	+1	11	.	11	+1	.	+1	11	.	.	+1

	Sampling Plot No:	78	79	21	22	33	39	9	10	11	17*	19	30	31	41	42	27	34	38	53	55	101	102
T	*Anagallis arvensis* var. *caerulea*	+1	.	.	+1	+1	+1	.	11	.	+1	.	.	.	+1	.	.	+1	.	.	+1	+1	.
T	*Centaurea cyanus*	.	.	.	.	+1	11	+1	+1	.	.	.	.	+1	.	+1	.	.	11	.	.	.	.
T	*Crepis sancta*	.	.	.	.	.	.	11	.	11	.	.	.	.	.	.	.	.	.	11	11	.	.
T	*Legousia speculum-veneris*	+1	.	.	.	.	.	11	.	.	.	+1	.	.	.	.	.	.	.	.	.	.	.
T	*Scandix pecten-veneris*	.	+1	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	.	.	11	.	.
T	*Lolium temulentum*												+1	.	.	.	.	.	.	.	.	.	.
T	*Papaver rhoeas*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
T	*Trifolium graniflorum*	11	+1	.	+1	+1	+1	.	.	.	11	.	11	11	+1	11	+1	+1	11	.	.	.	.
T	*Scandix australis* subsp. *grandiflora*			.	.	.	.	11	22	21	.	.	11	.	.	.	+1	.	.	.	.	.	.
Nan. Ph	*Ruscus aculeatus*	.	.	12	.	.	+2	+2	.	.	.	+2	.	12	.	.	.	.	.	+2	.	.	.
Nan. Ph	*Styrax officinalis*	.	.	12	.	.	.	.	.	.	.	12	.	.	.	.	.	.	.	.	.	.	.
Companion species																							
G	*Asphodelus aestivus*	+1	+1	11	11	11	+1	.	+1	11	11	11	11	11	11	11	.	11	11	11	11	11	11
Ch	*Euphorbia acanthothamnos*	12	+2	.	.	.	33	22	22	22	12	12	12	12	12	22	12	12	22	12	12	12	12
T	*Sherardia arvensis*	+1	+1	+1	.	11	.	+1	11	.	11	11	11	+1	+1	+1	+1	.	+1	.	11	11	+1
T	*Lagoecia cuminoides*	22	11	.	+1	11	11	.	11	.	11	11	11	11	11	22	+1	11	22	.	22	.	11
T	*Parietaria lusitanica*	+1	.	+1	.	+1	+1	+1	+1	22	+1	11	+1	+1	+1	+1	+1	.	.	.	.	+1	.
G	*Muscari comosum*	.	.	+1	+1	+1	+1	.	+1	11	+1	.	+1	+1	+1	+1	+1	+1	+1	.	.	+1	+1
T	*Briza maxima*	+1	+1	.	11	+1	11	.	+1	+1	11	.	+1	+1	11	.	+1	11	11	.	.	11	+1
T	*Trifolium campestre*	+1	+1	.	+1	+1	11	.	.	.	11	+1	11	11	.	.	11	11	+1	.	21	11	22
T	*Trifolium stellatum* var. *stellatum*	33	22	.	.	11	11	.	.	.	11	11	11	11	11	22	11	11	11	.	11	22	.
	Anthemis chia	+1	.	.	.	+1	+1	.	11	11	11	11	11	+1	.	.	+1	+1	.	.	+1	.	+1
T	*Bromus diandrus*	.	.	.	.	11	22	.	22	+1	+1	.	11	11	22	22	.	11	11	.	.	+1	.
T	*Arabis verna*	.	.	+1	.	+1	.	+1	11	+1	+1	11	+1	+1	.	+1	+1	+1	.	+1	+1	.	.
T	*Anthemis chia*	+1	.	.	.	+1	+1	.	11	11	11	11	11	+1	.	.	+1	+1	.	.	+1	.	+1
H	*Dactylis glomerata* subsp. *hispanica*	+2	12	.	.	12	22	.	.	.	.	.	.	12	12	12	.	12	22	+2	.	12	12
T	*Geranium lucidum*	+1	.	11	.	11	11	11	21	.	+1	11	+1	+1	.	11	+1	.	11	.	.	.	.
T	*Cynosurus echinatus*	11	11	+1	+1	11	11	.	.	.	.	.	+1	11	.	11	.	.	11	.	.	.	.
Nan. Ph	*Origanum onites*	.	.	12	12	.	.	.	+2	.	12	12	12	.	.	.	12	.	12	.	22	12	.
T	*Torilis arvensis* subsp. *purpurea*	+1	.	.	11	11	11	11	+1	.	21	.	11	11	.	.	11	11	.	.	.	+1	.
T	*Urospermum picroides*	11	+1	.	.	+1	.	.	.	.	+1	.	.	+1	+1	+1	+1	+1	.	.	11	11	.
T	*Crepis foetida* subsp. *commutata*	+1	.	.	+1	.	.	.	.	.	11	11	+1	.	.	.	+1	11	.	.	+1	21	11

	Sampling Plot No:	78	79	21	22	33	39	9	10	11	17*	19	30	31	41	42	27	34	38	53	55	101	102
T	*Veronica cymbalaria*	.	.	22	.	.	.	+1	11	11	+1	11	11	.	.	.	+1	.	+1	11	.	.	.
T	*Euphorbia peplus* var. *peplus*	+1	+1	.	.	11	.	11	.	11	.	+1	.	.	.	.	.	.	.	.	.	.	+1
T	*Filago eriocephala*	.	.	+1	+1	11	.	.	.	.	.	11	+1	.	.	+1	.	11	.	.	+1	11	11
T	*Valantia hispida*	+1	.	.	.	+1	.	.	.	.	+1	+1	.	.	.	+1	.	+1	.	.	.	11	.
G	*Hordeum bulbosum*	.	.	+2	.	+1	.	.	.	.	+1	.	.	+1	11	11	.	11	11	.	.	11	.
T	*Lathyrus aphaca* var. *pseudoaphaca*	+1	11	.	22	.	.	.	.	.	11	.	.	11	.	.	11	11	.	.	11	.	.
T	*Coronilla parviflora*	22	33	.	+1	.	.	.	.	11	11	11	.	.	.	.	.	.	.	.	.	.	.
Ch	*Umbilicus horizontalis* subsp. *horizontalis*	.	.	+1	.	.	.	+1	.	+1	+1	+1	.	.	+1	.	.	.	.	.	.	.	.
T	*Rostraria cristata* var. *cristata*	+1	.	.	.	.	+1	.	.	.	.	+1	.	.	+1	11	.	.	+1	.	.	.	+1
T	*Linum bienne*	+1	+1	.	.	.	+1	.	.	.	+1	.	+1	.	.	.	.	.	+1	.	.	11	.
T	*Melilotus italica*			.	.	+1	.	.	11	11	11	.	+1	+1	+1	.	.	.	.	11	.	.	.
T	*Coronilla cretica*					+1	.	11	11	.	.	.	11	11	.	11	.	+1	.	.	11	.	.
T	*Rhagadiolus stellatus* var. *edulis*	.	.	+1	.	.	.	+1	.	11	.	.	11	+1	.	11	+1	.	.	.	.	+1	.
T	*Scrophularia peregrina*	+1	.	+1	.	.	.	.	+1	+1	.	+1	.	.	.	.	+1	.	.	.	.	.	.
T	*Geranium molle* subsp. *molle*	.	.	+1	.	.	.	.	.	+1	+1	+1	11	.	.	.	.	.	.	.	11	+1	.
T	*Valeriana dioscoridis*					+1	+1	.	.	+1	.	.	.	+1	.	.	.	.	11	+1	+1	.	.
T	*Avena sterilis* subsp. *ludoviciana*					+1	11	.	11	.	.	.	.	11	11	11	.	11	+1	.	.	.	.
T	*Cerastium glomeratum*	.	.	+1	.	+1	.	+1	.	.	.	+1	.	.	.	+1	+1	.	.	.	.	.	.
T	*Trifolium hirtum*	.	.	.	.	.	+1	.	.	.	+1	.	.	.	11	11	.	.	.	.	.	+1	22
T	*Crucianella imbricata*	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	.	.	+1	11	11
G	*Ornithogalum narbonense*	.	.	.	.	.	+1	.	.	.	.	.	.	+1	.	+1	.	+1	+1	.	.	+1	11
T	*Avena sterilis* subsp. *sterilis*	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	11	11
T	*Catapodium rigidum* subsp. *rigidum* var. *rigidum*			.	.	+1	.	.	.	.	.	.	.	.	.	+1	.	+1	.	.	.	11	+1
H	*Mandragora autumnalis*			+1	.	.	.	.	.	.	.	+1	+1	.	.	.	.	+1	.	.	+1	+1	.
H	*Rumex tuberosus* subsp. *creticus*			+1	.	.	.	+1	.	.	+1	11	+1	+1	.	.	.	.	.	.	+1	.	.
T	*Trigonella monspeliaca*					+1	.	.	.	.	.	.	.	+1	+1	+1	+1	+1	.	.	.	.	.
H	*Sanguisorba minor* subsp. *magnolii*	.	.	.	.	.	.	.	.	.	+1	+1	.	.	+1	.	.	.	+1	.	.	11	.
T	*Bromus intermedius*	+1	.	.	.	+1	.	.	.	.	21	.	.	.	22	.	.	.	11	.	.	.	.
H	*Knautia integrifolia* var. *bidens*	.	.	.	.	+1	.	.	.	+1	.	.	.	.	.	.	.	.	11	.	.	21	11
T	*Myosotis ramosissima* subsp. *ramosissima*	.	.	22	.	.	.	+1	.	.	.	11	+1	+1	.	.	+1	.	.	.	.	.	.
Nan. Ph	*Phlomis grandiflora* subsp. *grandiflora*	22	12	.	.	22	12	.	.	.	.	.	.	.	.	.	.	.	12	.	.	.	.
T	*Campanula drabifolia*		+1	.	.	+1	.	.	.	.	+1	.	.	.	+1	+1	.	.	.	.	.	+1	.

	Sampling Plot No:	78	79	21	22	33	39	9	10	11	17*	19	30	31	41	42	27	34	38	53	55	101	102
T	*Biscutella didyma*			.	.	.	.	.	.	.	.	.	.	.	+1	.	+1	+1	.	.	.	.	+1
H	*Piptatherum miliaceum* subsp. *thomasii*	+2	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
H	*Vicia cassia*	.	.	.	.	11	+1	.	.	.	.	.	11	11	.	.	.	.	.	11	.	.	.
H	*Scorzonera elata*	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	+1	+1	.	.	.	+1
T	*Arrhenatherum palaestinum*	.	.	.	.	12	+1	.	.	.	.	.	.	.	.	.	11	11	.	.	.	.	.
H	*Tamus communis* subsp. *communis*	.	.	.	.	.	.	11	.	.	.	.	.	.	.	.	+1	.	+1	.	.	.	.
H	*Bryonia cretica*	.	.	.	.	.	.	.	.	+1	.	+1	.	11	.	11	.	.	+1	.	.	.	.
H	*Onosma frutescens*	.	.	+1	+1	.	.	.	+2	+2	+1	.	.	.	.	.	.	.	.	.	.	.	.
T	*Galium aparine*	.	.	.	.	.	.	+1	11	11	.	.	.	+1	.	.	+1	.	.	.	.	.	.
T	*Mercurialis annua*	.	.	.	.	.	.	.	11	+1	+1	.	.	.	+1	.	.	.	.	.	.	.	.
T	*Ranunculus chius*	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	11	11	.	.
H	*Verbascum propontideum*	.	.	.	+2	+2	.	.	+2	+2	12	.	.	.	.	.	.	.	.	.	.	.	.
T	*Torilis leptophylla*	+1	11	.	.	.	.	.	.	.	.	.	.	.	11	22	.	.	22	.	.	.	.
G	*Ophrys candida* subsp. *lyciensis*			.	+1	.	+1	.	.	.	.	+1	.	.	.	.	+1	.	+1	.	.	.	.
T	*Minuartia hybrida subsp. hybrida*			+1	.	.	.	.	.	.	.	+1	.	+1	.	.	+1	.	+1	.	.	.	.
T	*Valerianella muricata*					11	.	.	.	.	.	11	.	.	.	+1	+1	.	.	.	.	.	+1
Nan. Ph	*Ballota acetobulosa*	.	12	.	.	.	.	.	.	12	.	.	.	.	.	.	.	.	.	.	.	12	.
H	*Vicia villosa* subsp. *eriocarpa*	.	.	.	.	.	.	11	11	.	.	.	.	.	11	11	.	.	.	.	.	.	.
T	*Daucus guttatus*	+1	+1	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	11
T	*Medicago minima* var. *minima*	.	+1	.	.	.	.	.	.	.	+1	+1	.	.	.	.	11	.	.	.	.	.	.
T	*Trifolium scabrum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	11
T	*Crepis foetida* subsp. *rhoeadifolia*	11	+1	.	.	.	.	.	.	11	.	.	.	.	.	.	.	.	.	.	.	.	.
H	*Vicia villosa* subsp. *dasycarpa*	.	.	+1	21	.	.	.	.	.	21	11	.	.	.	.	.	.	.	.	.	.	.
T	*Pallenis spinosa*	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	+1	.	.	.	+1	+1
T	*Bromus rigidus*	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22	.	.
G	*Leontodon tuberosus*	.	.	.	.	.	.	+1	.	.	.	+1	.	.	.	.	.	.	.	11	11	.	.
T	*Cerastium illyricum* subsp. *comatum*	.	.	+1	.	.	.	.	.	.	.	+1	+1	.	.	.	+1	.	.	.	.	.	.
G	*Fritillaria sibthorpiana* subsp. *sibthorpiana*	.	.	.	.	.	+1	+1	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	.
T	*Galium brevifolium* subsp. *brevifolium*	.	.	.	.	11	.	.	11	11	.	.	.	.	.	.	.	.	.	.	.	.	.
T	*Lamium amplexicaule*	.	.	.	.	.	.	+1	.	+1	.	.	.	.	.	.	+1	.	.	.	.	.	.
T	*Trifolium tomentosum*	+1	.	.	+1	.	.	.	.	.	11	11	.	.	.	.	.	.	.	.	.	.	.
T	*Lathyrus annuus*	.	+1	.	+1	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	.	.	.

	Sampling Plot No:	78	79	21	22	33	39	9	10	11	17*	19	30	31	41	42	27	34	38	53	55	101	102
T	*Senecio vernalis*	.	.	.	.	.	.	.	.	11	+1	.	.	+1	.	.	.	.	.	+1	.	.	.
G	*Gagea graeca*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	11	.	.	+1
T	*Thlaspi perfoliatum*	.	.	.	.	.	.	+1	.	+1	.	+1	.	.	.	.	.	.	.	11	.	.	.

Low-frequency taxa: *Umbilicus horizontalis* subsp. i*ntermedius* (Ch) +1 (30), +1 (27), +1 (34); *Andropogon distachyos* (H) +2 (22), +12 (10); *Hymenocarpus circinnatus* (T) +1 (78), +1 (19), +1 (55); *Trachynia distachya* (T) 11 (101); *Medicago polymorpha* var. p*olymorpha* (T) +1 (78), 11 (101); *Rhagadiolus stellatus* var. *stellatus* (T) 11 (78), +1 (79); *Silene cretica* (T) +1 (21), +1 (41), 11 (101); *Sonchus oleraceus* (T) +1 (10), +1 (11); *Urtica membranacea* (T) +1 (21); *Lavatera punctata* (T) +1 (101); *Parentucellia latifolia* subsp. *latifolia* (T) +1 (30), +1 (27); *Valerianella discoidea* (T) 11 (9), +1 (10); *Dranunculus vulgaris* (G) +1 (78), +1 (27); *Orchis anatolica* (G) +1 (78), +1 (9), +1 (38); *Ranunculus* asiaticus (H) +1 (78), 11 (10), 11 (11); *Knautia integrifolia* var. *integrifolia* (H) +1 (79), 11 (41), 11 (42); *Linum strictum* var. *spicatum* (T) +1 (39), 11 (101); *Cuscuta palaestina* subsp. *palaestina* (T) +1 (101), 11 (102); *Ranunculus paludosus* (H) 11 (21), 11 (30), +1 (53); *Veronica arvensis* (T) +1 (21), +1 (19), +1 (27); *Silene behen* (T) +1 (33), +1 (10), +1 (17); *Erodium cicutarium subsp. cicutarium* (T) +1 (41); *Ornithogalum umbellatum* (G) 11 (9), +1 (17), 11 (55); *Silene dichotoma* subsp. *dichotoma* (H) +1 (10), +1 (41), +1 (38); *Tordylium aegaeum* (T) +1 (10), +1 (41), +1 (42); *Scaligeria napiformis* (H) 11 (102); *Ranunculus neapolitanus* (H) 11 (21), +1 (19); *Torilis arvensis* subsp. *elongata* (T) 22 (53); *Vicia pubescens* (H) 22 (53), 11 (102); *Trifolium angustifolium* var. *angustifolium* (T) +1 (78), 11 (101); *Picnomon acarna* (T) +1 (42); *Medicago disciformis* (T) +1 (9), +1 (19); *Scorpiurus muricatus* subsp. *subvillosus* (T) +1 (55), +1 (102); *Cardamine graeca* (T) +1 (9); *Cutandia stenostachya* (T) +1 (39), +1 (19); *Vicia cuspidata* (H) *+1 (38); Picris pauciflora* (H) *11 (101), 11 (102); Petrorhagia velutina* (T) *+1 (39), +1 (34); Poa bulbosa* (H) +2 (22), 12 (19); *Stellaria media* subsp. *neglecta* (T) +1 (19); *Bromus hordeaceus* subsp. *hordeaceus* (T) 11 (42); *Trifolium boissieri* (T) +1 (42); *Vicia villosa subsp. microphylla* (H) 11 (27); *Lolium rigidum* var. *rottbollioides* (H) +1 (78), +1 (41); *Stachys spinulosa* (T) +1 (78), 11 (10); *Serapias politisii* (G) +1 (78), +1 (102); *Vicia hybrida* (H) +1 (78), +1 (79); *Anacamptis pyramidalis* (G) +1 (79), +1 (39); *Malva sylvestris* (T) +1 (79), +1 (101); *Galium murale* (T) +1 (19), +1 (34); *Orobanche ramosa* (G) +1 (11), +1 (31); *Plantago lagopus* (T) 22 (55), 11 (101); *Sisymbrium officinale* (T) 11 (10), +1 (17); *Stellaria media* subsp. *postii* (T) +1 (21), +1 (42); *Vicia galilaea* (T) +1 (22), 11 (10); *Lagurus ovatus* (T) +1 (39); *Legousia pentagonia* (T) +1 (39), +1 (31); *Ranunculus creticus* (H) +1 (39), +1 (38); *Sideritis curvidens* (T) 11 (41); *Rostraria cristata* var. *glabriflora* (T) 11 (34); *Pisum fulvum* (T) +1 (9), 11 (10); *Ranunculus marginatus* var. *trachycarpus* (T) 11 (9), 11 (19); *Stellaria media* subsp. *media* (T) 11 (9), +1 (10); *Onopordum bracteatum* subsp. *bracteatum* (H) +1 (10), +1 (41); *Senecio vulgaris* (T) +1 (10), +1 (19); *Falcaria vulgaris* (T) +1 (17), 11 (19); *Peltaria angustifolia* (T) 11 (17), 11 (101); *Daucus carota* subsp. *carota* (H) +1 (19), 11 (101); *Lathyrus cicera* (T) +1 (31), +1 (34); *Trifolium argutum* (T) 11 (41), 11 (42); *Gastridium phleoides* (T) 11 (104); *Phlomis bourgaei* (Nan. Ph) +2 (55); *Sonchus asper* subsp. *glaucescens* (T) +1 (101); *Stachys cretica* subsp. *smyrnaea* (Nan. Ph) +2 (17); *Aristolochia hirta* (H) 11 (9); *Bromus sterilis* (T) 11 (27); *Lathyrus aphaca* var. *affinis* (T) +1 (19); *Onobrychis caput-galli* (T) +1 (34); *Trifolium angustifolium* var. *intermedium* (T) 11 (102); *Carduus pycnocephalus* subsp. *albidus* (H) +1 (42); *Stellaria media* subsp. *pallida* (T) +1 (21); *Trifolium nigrescens* subsp. *petrisavii* (T) 22 (101); *Gerapogon hybridus* (H) +1 (41); *Lens ervoides* (T) +1 (79); *Lolium perenne* (H) 12 (34); *Linum corymbulosum* (T) 11 (102); *Polycarpon tetraphyllum* (T) +1 (33); *Phleum exaratum* subsp. *aegaeum* (T) +1 (101); *Geranium columbinum* (T) +1 (102); *Trigonella spicata* (T) +1 (9); *Trifolium pilulare* (T) +1 (78); *Vicia sativa* subsp. *nigra* var. *nigra* (H) +1 (78); *Anemone coronaria* (G) +1 (38); *Fumaria macrocarpa* (T) +1 (10); *Bromus chrysopogon* (T) +1 (22); *Lotus ornithopodioides* (T) 11 (22); *Bromus scoparius* (T) +1 (33); *Phleum boissieri* (T) 11 (33); *Pistacia atlantica* (Nan. Ph) 12 (33); *Pisum sativum* subsp. *elatius* var. *arvense* (T) +1 (33); *Rumex tuberosus* subsp. *tuberosus* (H) +1 (39); *Galium spurium* subsp. *spurium* (T) +1 (9); *Carduus pycnocephalus* subsp. *pycnocephalus* (H) +1 (10); *Fumaria parviflora* (T) +1 (11); *Salvia virgata* (T) +1 (19); *Pisum sativum* subsp. *elatius* var. *elatius* (T) +1 (31); *Sedum litoreum* (K) +1 (31); *Aegilops umbellulata* subsp. *umbellulata* (T) 11 (41); *Medicago littoralis* var. *littoralis* (T) +1 (41); *Fraxinus ornus* subsp. *ornus* (Nan. Ph) +1 (42); *Pisum sativum* subsp. *elatius* var. *pumilio* (T) +1 (42); *Melilotus elegans* (T) +1 (27); *Anchusa undulata* subsp. *hybrida* (T) +1 (34); *Medicago praecox* (T) +1 (34); *Sanguisorba minor* subsp. *minor* (H) +1 (34); *Medicago coronata* (T) +1 (55); *Ophrys cinereophila* (G) +1 (53); *Erodium malacoides* (T) +1 (55); *Medicago rugosa* (T) +1 (101); *Plantago cretica* (T) +1 (101); *Smyrnium rotundifolium* (T) +1 (101); *Trigonella balansae* (T) +1 (101); *Bupleurum gracile* (T) +1 (102); *Centuarium erythraea* subsp. *rumelicum* (T) +1 (102); *Vicia sativa* subsp. *sativa* (H) +1 (102).

Abbreviations: Cal. = calcareous bedrock; Alt. = altitude (m); Incl. = inclination (%); Tree cov. = tree layer cover (%); Shrub cov. = shrub layer cover (%); Herb cov. = herb layer cover (%); Sampling plot area = vegetation sampling plot size (m^2). Life-form abbreviations: Th = Therophyte; H = Hemicryptophyte; G = Geophyte; Ch = Chamaephyte; Nan. Ph = Nanophanerophyte; Mic Ph = Microphanerophyte. Companion species = accompanying taxa without diagnostic value for the association; Low-frequency taxa = taxa recorded in a limited number of sampling plots. * = holotypus of the newly described association.

Table 7: Vegetation table of *Andropogono distachyi-Sarcopoterietum spinosi* Akbaş & Varol ass. nov. (Holotypus: Sampling plot no 67).
Tabela 7: Vegetacijska tabela asociacije *Andropogono distachyi-Sarcopoterietum spinosi* Akbaş & Varol ass. nov. (Holotip: popis št. 67).

LIFE FORMS	**Sampling Plot No:**	**80**	**81**	**82**	**83**	**90**	**91**	**93**	**94**	**96**	**1**	**3**	**60**	**61**	**84**	**65**	**86**	**66**	**67***	**69**	**70**	**71**	**87**	**89**
	Size of sampling plot (m^2)	256	256	256	256	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	Altitude (m)	100	130	160	106	40	70	39	106	105	191	170	167	185	266	170	270	109	138	185	75	75	260	220
	Exposure (°)	NW	S	SE	N	NE	NE	W	SE	N	E	S	N	W	W	SE	NE	SE	NW	SE	W	E	N	SE
	Inclination (°)	10	10	10	10	15	15	10	15	10	23	32	10	10	5	5	5	5	10	5	5	2	5	3
	Coverage of trees (%)																							
	Height of trees (m)																							
	Coverage of shrubs (%)	75	80	70	70	50	50	50	50	55	90	90	90	90	90	80	70	85	80	80	85	60	85	85
	Height of shrubs (m)	3	3	3	2	0,5	1	1	1	1	0,7	0,7	1	1	1	0,5	1	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	Coverage of herbs (%)	80	85	80	80	60	60	40	70	40	30	40	50	25	90	60	85	35	30	40	35	40	70	70
	Height of herbs (cm)	100	100	100	100	100	100	100	100	100	100	60	40	100	100	100	100	100	100	100	100	100	100	100
	Bedrock	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.	Cal.
	Diagnostic species																							
Ch	*Sarcopoterium spinosum*	12	12	.	12	12	.	12	+2	12	33	22	33	22	33	44	33	44	44	44	44	44	55	55
H	*Andropogon distachyos*	.	22	22	.	.	.	12	22	.	22	33	.	32	33	22	.	33	33	22	22	22	.	22
T	*Crepis commutata*	+1	+1	.	.	11	11	11	.	11	.	+1	+1	.	.	+1	+1	.	+1	+1	+1	.	+1	+1
T	*Valantia hispida*	.	+1	.	.	21	21	11	11	11	.	.	.	.	.	+1	+1	.	+1	+1	+1	+1	.	+1
Character species of the alliance *Cistion orientali*																								
Nan. Ph	*Lavandula stoechas* subsp. *stoechas*	.	.	.	.	.	.	.	.	.	22	22	22	22	+2	.	.	.	.	+2	.	.	.	.
Character species of the order *Cisto-Micromeritalia*																								
Nan. Ph	*Fumana arabica*	.	.	.	.	+2	+2	+2	+2	.	22	22	.	.	12	+2	.	.	+2	.	.	.	.	.
G	*Drimia maritima*	.	+1	.	.	11	+1	+1	.	+1	.	.	.	.	.	11	.	21	+1	+1	+1	+1	.	11
Character species of the class *Cisto-Micromerietea*																								
Ch	*Genista acanthoclada*	12	12	.	.	33	22	33	33	22	22	44	.	33	22	.	.	.	.	.	.	.	.	.
Nan. Ph	*Calicotome villosa*	22	33	33	22	.	.	.	.	+2	.	+2	12	.	12	22	+2	.	.	+2	.	.	.	.
Nan. Ph	*Cistus salviifolius*	22	.	.	22	.	.	.	.	22	33	22	33	22	12	.	.	.	12	22	.	.	.	.
Nan. Ph	*Micromeria myrtifolia*	.	.	+2	.	.	.	+2	.	.	+2	12	+2	12	+2	+2	.	+2	+2	.	.	.	.	.
Nan. Ph	*Cistus creticus*	12	12	.	22	+2	.	.	.	+2	+2	22	+2	+2	22	12	+2	.	12	22	.	.	22	.
T	*Aira elegantissima* subsp. *elegantissima*	.	.	.	.	11	+1	+1	.	+1	.	.	.	.	+1	.	22	.	.	+1	.	.	22	.
Nan. Ph	*Salvia fruticosa*	.	.	.	.	+2	+2	+2	+1	12	.	.	.	.	12	.	.	.	.	.	.	.	.	.
Nan. Ph	*Coridothymus capitatus*					12	22	22	.	.	12	22	.	12	.	.	.	22	.	.	12	.	.	.

	Sampling Plot No:	80	81	82	83	90	91	93	94	96	1	3	60	61	84	65	86	66	67*	69	70	71	87	89
Nan. Ph	*Hypericum empetrifolium*	12	.	.	.	.	.	.	.	.	+2	22	.	22	.	.	.	.	.	.	.	.	.	.
H	*Melica minuta*	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Character species of the class *Quercetea ilicis*																								
Nan. Ph	*Pistacia lentiscus*	22	.	22	12	.	.	+2	.	12	+2	+2	.	.	22	.	.	.	.	.	.	.	.	.
Nan. Ph	*Asparagus aphyllus* subsp. *orientalis*	11	.	+1	.	.	.	.	.	+1	.	.	.	.	+1	+1	.	.	.	.	.	.	.	.
Nan. Ph	*Daphne gnidioides*	+2	12	12	.	12	22	12	+2	+2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
H	*Piptatherum coerulescens*	22	.	22	.	.	.	.	+2	+2	.	.	.	.	+2	.	.	.	.	.	.	.	.	.
H	*Piptatherum miliaceum* subsp. *thomasii*	.	.	.	.	.	.	.	.	.	.	.	.	32	.	.	.	.	.	.	.	.	.	.
Nan. Ph	*Phagnalon graecum*	.	+2	.	.	.	.	+2	+2	.	.	.	.	.	+1	+2	.	.	.	.	.	.	.	.
Nan. Ph	*Rubia tenuifolia* subsp. *brachypoda*	12	.	.	+2	.	.	.	.	+2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nan. Ph	*Clematis cirrhosa*	.	.	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Nan. Ph	*Quercus coccifera*	22	22	22	22	.	.	.	.	12	.	.	.	.	12	.	+2	.	.	.	.	.	.	.
Nan. Ph	*Olea europaea* var. *sylvestris*	12	.	+2	.	12	.	+2	.	.	.	.	.	.	12	.	.	.	.	.	.	.	.	.
T	*Geranium purpureum*	.	.	.	.	+1	.	.	.	+1	.	.	.	.	+1	.	.	.	+1	.	.	.	.	.
Nan. Ph	*Smilax aspera*	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	.	.	.
Nan. Ph	*Phillyrea latifolia*	.	.	.	.	.	.	.	.	.	.	.	.	.	+2	.	.	.	.	.	.	.	.	.
Character species of the class *Quercetea pubescentis*																								
T	*Trifolium speciosum*	+1	+1	+1	11	.	.	.	+1	.	.	.	+1	.	+1	+1	11	+1	+1	+1	.	.	+1	+1
H	*Silene italica*	.	.	.	12	.	.	.	.	.	.	.	.	.	+2	.	.	.	.	.	.	.	+2	.
Nan. Ph	*Crataegus monogyna* subsp. *azarella*	.	.	+2	.	.	.	.	.	.	.	.	.	.	+2	+2	.	.	.	.	.	.	.	.
T	*Scandix australis* subsp. *grandiflora*					.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	+1
T	*Campanula lyrata* subsp. *lyrata*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	.
Companion species																								
T	*Anthemis chia*	.	.	.	+1	.	+1	.	.	.	.	+1	.	.	.	.	+1	.	.	+1	+1	.	+1	+1
T	*Plantago cretica*					11	22	.	.	.	.	.	.	.	.	+1	22	11	11	+1	11	.	11	11
G	*Asphodelus aestivus*	.	+1	+1	+1	11	11	+1	+1	+1	11	21	.	11	+1	11	22	11	.	+1	+1	+1	.	+1
T	*Rumex bucephalophorus*	.	.	.	.	.	.	.	.	.	.	.	11	.	.	.	+1	.	.	11	.	.	11	+1
T	*Trifolium campestre*	22	+1	+1	11	11	11	+1	11	21	.	.	+1	.	11	11	11	+1	.	11	+1	+1	22	22
T	*Convolvulus althaeoides*	.	.	.	11	+1	+1	+1	.	11	.	11	.	.	.	+1	.	+1	.	.	+1	.	+1	.
T	*Linum strictum* var. *spicatum*	+1	+1	+1	.	11	11	11	+1	.	.	.	.	.	.	.	.	11	+1	.	.	.	.	.
T	*Anagallis arvensis* var. *caerulea*	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	.	.	+1	.	+1	.	+1	.	+1	+1	+1	+1
T	*Trifolium stellatum* var. *stellatum*	11	+1	+1	22	.	+1	.	+1	.	.	.	11	.	+1	+1	11	.	+1	11	11	22	11	11
T	*Lagoecia cuminoides*	+1	+1	+1	+1	+1	11	11	.	11	.	.	.	.	+1	11	+1	.	+1	.	+1	+1	11	11

	Sampling Plot No:	80	81	82	83	90	91	93	94	96	1	3	60	61	84	65	86	66	67*	69	70	71	87	89
T	*Bromus diandrus*	.	.	+1	22	.	.	+1	.	+1	+1	.	.	11	11	.	11	.	+1	+1	+1	+1	+1	+1
Nan. Ph	*Origanum onites*	12	12	.	12	.	.	12	.	12	.	22	.	.	+2	.	+2	+2	12	+2	.	.	+2	+2
G	*Leontodon tuberosus*	.	+1	11	+1	.	.	.	.	.	11	.	+1	11	.	+1	+1	+1	+1	.	+1	+1	+1	.
G	*Muscari comosum*	.	+1	+1	+1	+1	+1	.	+1	+1	.	+1	.	.	+1	.	.	+1	+1	.	+1	.	+1	.
T	*Euphorbia peplus* var. *peplus*	.	+1	+1	+1	+1	+1	+1	+1	+1	.	.	.	.	.	.	+1	.	+1	.	.	.	+1	+1
T	*Sherardia arvensis*	+1	+1	+1	.	+1	+1	.	+1	.	.	+1	+1	.	.	+1	+1	.	+1	.	.	.	+1	.
T	*Briza maxima*	.	+1	+1	+1	.	.	+1	.	+1	.	.	.	.	+1	.	+1	.	+1	+1	+1	.	.	+1
H	*Festuca* sp.	.	.	.	+2	.	.	.	.	+2	+2	.	12	.	+2	.	12	.	+2	.	+2	.	12	12
T	*Urospermum picroides*	+1	+1	+1	.	+1	+1	.	11	+1	.	.	+1	.	.	+1	.	.	+1	.	.	.	.	.
H	*Dactylis glomerata* subsp. *hispanica*	12	12	12	12	.	.	.	.	.	.	.	12	33	+2	.	22	.	.	.	.	.	12	12
T	*Bromus fasciculatus*	.	.	.	.	33	22	22	.	.	.	.	.	.	.	.	11	11	11	+1	22	22	22	.
T	*Catapodium rigidum* subsp. *rigidum* var. *rigidum*	+1	.	.	.	+1	+1	+1	+1	11	.	.	.	.	+1	.	.	.	+1	.	+1	.	.	+1
T	*Linum bienne*	.	+1	+1	11	+1	+1	.	+1	.	.	.	.	.	+1	.	.	.	.	.	+1	.	.	+1
T	*Trifolium nigrescens* subsp. *petrisavii*	11	11	11	.	.	.	.	.	.	.	.	.	.	22	.	22	.	.	.	11	11	22	22
G	*Gagea graeca*				+1	+1	+1	+1	+1	+1	.	.	.	.	+1	.	+1	.	.	.	.	.	+1	.
T	*Onobrychis caput-galli*	+1	11	.	.	.	.	+1	.	.	.	.	.	+1	+1	+1	.	.	.	+1	.	.	+1	+1
T	*Biscutella didyma*	+1	.	.	.	+1	+1	+1	.	.	.	.	.	.	.	+1	.	.	+1	+1	.	+1	.	.
T	*Filago eriocephala*	+1	.	.	.	.	+1	.	+1	21	.	.	+1	.	+1	.	+1	.	.	.	.	.	11	.
Nan. Ph	*Euphorbia acanthothamnos*	.	22	12	12	+2	+2	.	12	+2	.	.	.	.	.	.	.	.	12	.	.	.	.	.
T	*Geranium molle* subsp. *molle*	.	+1	+1	.	.	.	.	+1	.	.	.	.	.	.	.	+1	.	+1	+1	+1	.	.	+1
T	*Trifolium scabrum*	.	.	.	.	.	+1	+1	+1	+1	.	.	.	.	.	.	.	11	11	+1	.	.	.	+1
T	*Avena sterilis* subsp. *sterilis*	.	11	+1	11	.	.	.	+1	+1	.	.	.	.	.	.	+1	.	.	.	+1	.	.	11
T	*Trifolium hirtum*	.	.	+1	.	.	+1	.	.	.	.	.	.	.	+1	22	11	.	+1	.	+1	+1	.	.
T	*Cynosurus echinatus*	+1	11	.	11	.	.	.	.	+1	.	.	.	.	11	.	+1	.	.	.	.	.	11	.
T	*Gastridium phleoides*	.	11	.	.	+1	.	+1	+1	22	.	.	.	.	+1	.	.	.	.	.	.	.	.	+1
T	*Trifolium tomentosum*	.	.	.	.	.	.	.	.	.	.	.	.	.	11	.	.	.	+1	11	11	11	11	+1
T	*Tuberaria guttata* var. *plantaginea*	.	.	.	.	11	11	.	.	.	.	.	11	.	.	.	+1	.	+1	.	.	.	22	+1
Nan. Ph	*Pyrus amygdaliformis* var. *amygdaliformis*	.	.	.	.	.	.	.	.	.	+2	+2	.	+2	.	+2	+2	.	.	.	.	.	+2	+2
T	*Trachynia distachya*	+1	.	+1	.	11	+1	21	21	.	.	.	.	.	+1	.	.	.	.	.	.	.	.	.
T	*Ornithogalum narbonense*	+1	+1	+1	.	+1	+1	+1	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
T	*Scorpiurus muricatus* subsp. *subvillosus*	.	+1	+1	.	+1	.	.	+1	.	.	.	.	.	+1	.	.	.	.	.	+1	+1	.	.
T	*Torilis leptophylla*	11	+1	.	.	11	.	+1	.	.	.	.	.	.	.	.	.	.	11	.	+1	.	.	+1
T	*Salvia viridis*		+1	.	.	11	+1	.	11	.	.	.	.	.	.	+1	.	.	+1	.	.	+1	.	.

	Sampling Plot No:	80	81	82	83	90	91	93	94	96	1	3	60	61	84	65	86	66	67*	69	70	71	87	89
T	*Bromus intermedius*	22	22	22	22	.	11	.	.	.	.	.	.	.	.	+1	.	.	.	.	.	.	.	.
T	*Crucianella imbricata*	.	.	.	.	22	11	11	11	+1	.	.	.	.	+1	.	.	.	.	.	.	.	.	.
T	*Petrorhagia velutina*	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	+1	.	.	+1	+1	.	+1	+1
T	*Rostraria cristata var. cristata*	.	.	.	.	.	+1	+1	.	.	11	.	.	.	.	11	+1	.	.	.	.	.	+1	.
T	*Torilis arvensis subsp. purpurea*	.	.	11	+1	.	.	.	.	+1	.	.	.	.	+1	.	+1	.	.	.	.	.	+1	.
H	*Ranunculus paludosus*	.	.	.	.	.	.	.	.	.	.	.	.	11	11	11	11	.	.	.	+1	.	+1	.
T	*Trigonella monspeliaca*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	+1	11	+1	+1	+1	.	.
T	*Parietaria lusitanica*	.	.	.	.	+1	+1	+1	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.
Nan. Ph	*Quercus aucheri*	.	.	.	22	+2	.	+2	.	+2	.	+2	.	.	.	.	.	.	.	.	.	.	.	.
T	*Cerastium glomeratum*	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	+1	.	.	.	+1	+1	.	+1
T	*Rostraria cristata var. glabriflora*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	+1	+1	+1	+1	.	.
G	*Hordeum bulbosum*	12	.	+1	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	+1
H	*Vicia pubescens*	+1	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	+1	.	.	.	+1	.	+1
Nan. Ph	*Helichyrisum stoechas subsp. barrelieri*	+2	.	.	.	.	.	+2	.	+2	.	12	.	.	12	.	.	.	.	.	.	.	.	.
T	*Trifolium angustifolium var. angustifolium*	.	.	.	.	.	.	.	+1	.	.	.	.	.	11	.	11	.	.	+1	.	.	.	+1
H	*Lotus peregrinus var. peregrinus*	.	+1	+1	.	.	.	.	.	.	.	.	.	.	.	+1	.	+1	.	.	.	.	.	+1
T	*Senecio vernalis*	.	.	+1	.	+1	.	.	.	.	.	+1	.	.	.	.	+1	.	.	.	+1	.	.	.
T	*Hedypnois cretica*	.	.	.	.	.	+1	.	.	.	.	.	.	.	.	.	+1	.	.	.	.	+1	+1	+1
T	*Trifolium leucanthum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22	11	+1	+1	.	.	.	.	+1
Nan. Ph	*Phlomis lycia*	.	22	12	.	.	.	.	.	.	.	12	.	12	.	.	.	.	.	.	.	.	.	.
T	*Campanula drabifolia*	.	+1	+1	.	.	.	+1	.	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
T	*Vulpia ciliata subsp. ciliata*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	+1	+1	.	11	.
Nan. Ph	*Hypericum empetrifolium*	12	.	.	.	.	.	.	.	.	+2	22	.	22	.	.	.	.	.	.	.	.	.	.
T	*Lysimachia linum-stellatum*	.	.	.	.	+1	11	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	+1	.
T	*Ornithopus compressus*	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.	+1	.	.	+1	.	.	.	+1
H	*Coronilla parviflora*	.	+1	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.	+1	.	.
T	*Bromus hordeaceus subsp. hordeaceus*	.	.	.	.	.	.	.	.	.	.	.	.	.	11	.	+1	.	.	.	.	.	11	22
T	*Galium murale*	+1	.	.	.	.	+1	.	+1	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.
G	*Mandragora autumnalis*	+1	.	.	.	.	.	.	+1	.	.	.	.	.	.	+1	.	.	.	.	+1	.	.	.
T	*Crucianella latifolia*	+1	11	11	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
T	*Trifolium angustifolium var. intermedium*	.	.	.	.	.	+1	.	.	.	.	.	.	.	.	.	.	.	+1	.	+1	.	11	.
T	*Lotus angustissimus*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	+1	+1	+1	.	.
T	*Sideritis curvidens*	.	.	.	.	.	.	+1	+1	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	+1

	Sampling Plot No:	80	81	82	83	90	91	93	94	96	1	3	60	61	84	65	86	66	67*	69	70	71	87	89
G	*Allium subhirsutum*	+1	+1	.	.	.	.	.	.	.	.	.	.	.	+1	+1	.	.	.	.	.	.	.	.
H	*Knautia integrifolia* var. *integrifolia*	.	.	.	.	11	11	.	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	+1	.
T	*Hippocrepis unisiliquosa* subsp. *unisiliquosa*	.	+1	.	.	.	.	+1	+1	.	.	.	.	.	.	.	.	.	.	.	+1	.	.	.
T	*Plantago lagopus*	.	+1	.	.	.	22	22	+1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Low-frequency taxa: *Scandix pecten-veneris* (T) +1 (83), 11 (86), +1 (89); *Aira elegantissima* subsp. *ambigua* (T) +1 (80), +1 (83), 11 (89); *Geranium lucidum* (T) +1 (83), +1 (60), +1 (87); *Onosma frutescens* (H) +1 (81), +2 (65), +1 (86); *Vicia cuspidata* (H) 11 (60), +1 (86), +1 (69); *Linaria pelisseriana* (T) +1 (60), +1 (86), +1 (87); *Scorzonera elata* (H) +1 (82), +1 (94), +1 (84); *Daucus guttatus* (T) +1 (82), +1 (91), +1 (93); *Hymenocarpus circinnatus* (T) +1 (84), +1 (70), +1 (71); *Orlaya daucoides* (T) +1 (81), +1 (82), +1 (90); *Serapias politisii* (G) +1 (91), +1 (84), +1 (87); *Bupleurum gracile* (T) 21 (90), 11 (91), 11 (93); *Filago pyramidata* (T) +1 (90), +1 (91), 11 (93); *Malva cretica* (T) +1 (90), +1 (91), +1 (94); *Scorzonera eriophora* (H) 11 (60), +1 (61), +2 (86); *Lotus conimbricensis* (T) +1 (86), +1 (87), +1 (89); *Medicago coronata* (T) +1 (94), 11 (60), +1 (86).*Bromus rigidus* (T) 11 (60), +1 (61); *Parentucellia latifolia* subsp. *latifolia* (T) +1 (87), +1 (89); *Erodium moschatum* (T) +1 (60), +1 (87); *Lathyrus aphaca* var. *pseudoaphaca* (T) +1 (84), +1 (65); *Mercurialis annua* (T) +1 (93), +1 (94); *Senecio vulgaris* (T) +1 (69), +1 (70); *Ranunculus asiaticus* (H) +1 (81), +1 (94); *Medicago minima* var. *minima* (T) +1 (81), +1 (70); *Ranunculus chius* (T) +1 (90), 11 (60); *Verbascum propontideum* (H) +2 (82), +2 (65); *Silene cretica* (T) +1 (87), +1 (89); *Umbilicus horizontalis* subsp. *horizontalis* (K) +1 (84), +1 (87); *Cuscuta palaestina* subsp. *palaestina* (H) +1 (82), +1 (90); *Rumex tuberosus* subsp. *creticus* (H) +1 (86), +1 (87); *Acinos rotundifolius* (T) +1 (67), +1 (71); *Cyclamen hederifolium* (G) +1 (80), +1 (94); *Cytinus hypocistis* subsp. *orientalis* (G) +1 (1), +1 (60); *Carex flacca* subsp. *serrulata* (H) +1 (1), +1 (84); *Lathyrus aphaca* var. *affinis* (T) +1 (80), +1 (71); *Arrhenatherum palaestinum* (G) +1 (84), +1 (86); *Anagyris foetida* (Nan. F) 12 (82), 12 (83); *Pallenis spinosa* (T) +1 (90), +1 (93); *Linum corymbulosum* (T) +1 (82), +1 (86); *Chrysanthemum segetum* (T) +1 (81), +1 (90); *Ophrys candida subsp. lyciensis* (G) +1 (81), +1 (84); *Sisymbrium officinale* (T) +1 (81), +1 (91); *Anemone coronaria* (G) +1 (83), +1 (65); *Avena sterilis subsp. ludoviciana* (T) +1 (90), +1 (91); *Valerianella muricata* (T) +1 (84), +1 (86); *Medicago praecox* (T) +1 (71), +1 (87); *Gynandriris sisyrichium* (G) +1 (61), +1 (65); *Stipa capensis* (H) 11 (90), 22 (93); *Valerianella obtusiloba* (T) +1 (90), +1 (91); *Atractylis cancellata* (T) 11 (93), +1 (94); *Neatostema apulum* (T) +1 (67), +1 (71); *Stachys arvensis* (T) +1 (67), +1 (69); *Echium plantagineum* (T) +1 (86), +1 (87). *Arabis verna* (T) +1 (80); *Cytinus hypocistis* subsp. *kermesinus* (G) +1 (83); *Veronica cymbalaria* (T) +1 (86); *Poa bulbosa* (G) +2 (83); *Valeriana dioscoridis* (H) +1 (60); *Crupina crupinastrum* (T) +1 (80); *Medicago arabica* (T) +1 (83); *Myosotis ramosissima* subsp. *ramosissima* (T) +1 (60); *Vicia hirsuta* (H) +1 (65); *Scrophularia peregrina* (T) +1 (86); *Thesium bergeri* (T) +1 (71); *Papaver rhoeas* (T) +1 (87); *Hypochaeris glabra* (T) +1 (86); *Serapias cordigera* (G) +1 (60); *Blackstonia perfoliata* subsp. *perfoliata* (T) +1 (93); *Phlomis bourgaei* (Nan. F) +2 (84); *Teucrium divaricatum* subsp. *villosum* (Nan F) 12 (61); *Vicia cassia* (H) +1 (82); *Rosularia serrata* (H) +1 (84); *Vicia villosa* subsp. *eriocarpa* (H) +1 (87); *Hypericum perfoliatum* (H) +1 (66); *Vicia cretica* (T) +1 (84); *Avena barbata* subsp. *barbata* (T) +1 (93); *Bromus sterilis* (T) 11 (69); *Medicago disciformis* +(T) 1 (89); *Knautia integrifolia* var. *bidens* (H) +1 (81); *Gladiolus anatolicus* (G) +1 (96); *Medicago orbicularis* (T) +1 (89); *Ptilostemon chamaepeuce* (H) +2 (84); *Picris altissima* (H) 11 (94); *Trifolium clypeatum* (T) +1 (84); *Gaudinia fragilis* (T) 11 (89); *Gerapogon hybridus* (H) +1 (94); *Trifolium subterraneum* (T) +1 (69); *Scrophularia lucida* (H) +1 (82); *Orobanche minör* (G) +1 (87); *Picris pauciflora* (H) 11 (94); *Fritillaria sibthorpiana* subsp. *sibthorpiana* (G) +1 (80); *Lavatera punctata* (T) +1 (82); *Valerianella discoidea* (T) 11 (87); *Lolium rigidum* var. *rottbollioides* (H) +1 (89); *Vicia sativa* subsp. *nigra* var. *nigra* (H) +1 (83); *Lathyrus annuus* (T) +1 (82);*Geranium columbinum* (T) +1 (81); *Lotus edulis* (T) +1 (81); *Lotus edulis* (T) +1 (81); *Trigonella spicata* (T) +1 (81); *Melilotus italica* (T) +1 (82); *Oxalis pes-caprea* (T) +1 (82); *Aegilops triuncialis* subsp. *triuncialis* (T) +1 (89); *Tordylium aegaeum* (T) +1 (89); *Erodium cicutarium subsp. cicutarium* (T) +1 (93); *Linum strictum* var. *strictum* (T) +1 (96); *Lathyrus cicera* (T) +1 (60); *Tordylium apulum* (T) +1 (87); *Erodium malacoides* (T) 11 (94); *Centuarium erythraea* subsp. *rumelicum* (T) +1 (93); *Rapistrum rugosum* (T) 21 (94); *Catananche lutea* (T) +1 (91); *Medicago rigidula* var. *rigidula* (T) +1 (91); *Anthyllis tetraphylla* (T) +1 (93); *Daucus carota* subsp. *majör* (H) 11 (94); *Polygala monspeliaca* (T) +1 (3); *Logfia gallica* (T) 11 (3); *Ophrys blitopertha* (G) +1 (61); *Ophrys lutea* subsp. *minör* (G) +1 (67); *Echium angustifolium* (T) +1 (70); *Valantia muralis* (T) +1 (70); *Euphorbia exigua* var. *exigua* (T) +1 (71); *Hyoseris scabra* (T) +1 (71); *Plantago afra* (T) +1 (71); *Centaurium pulchellum* (T) +1 (86); *Silene gallica* (T) +1 (86); *Valerianella orientalis* (T) +1 (86); *Evax pygmaea* (T) +1 (87); *Lathyrus setifolius* (T) +1 (86); *Parentucellia viscosa* (T) +1 (86); *Tolpis barbata* (T) +1 (86); *Vicia laxiflora* (H) +1 (86); *Phleum exaratum* subsp. *exaratum* (T) +1 (89); *Centaurium tenuiflorum* subsp. *acutiflorum* (T) +1 (89); *Juncus bufonius* (H) +1 (89).

Abbreviations: Cal. = calcareous bedrock; Alt. = altitude (m); Incl. = inclination (%); Tree cov. = tree layer cover (%); Shrub cov. = shrub layer cover (%); Herb cov. = herb layer cover (%); Sampling plot area = vegetation sampling plot size (m^2). Life-form abbreviations: Th = Therophyte; H = Hemicryptophyte; G = Geophyte; Ch = Chamaephyte; Nan. Ph = Nanophanerophyte. Companion species = accompanying taxa without diagnostic value for the association; Low-frequency taxa = taxa recorded in a limited number of sampling plots. * = holotypus of the newly described association.